

**Green Zia Environmental Excellence Program
Achievement-level Application:**

**Los Alamos National Laboratory
ESA Division**



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0 ORGANIZATIONAL OVERVIEW

0.1 BASIC ORGANIZATIONAL DESCRIPTION

Los Alamos National Laboratory (LANL) is owned by the US Department of Energy (DOE) and operated under contract by the University of California (UC). Established in 1943 as part of the Manhattan Project, LANL's original mission was to design, develop, and test nuclear weapons. As technologies, US priorities, and the world community have changed, LANL's mission has broadened to enhancing global security by ensuring safety and confidence in the US nuclear weapons stockpile, developing technical solutions to reduce the threat of weapons of mass destruction, and improving the environmental and nuclear materials legacy of the Cold War. In addition, LANL applies its scientific and engineering capabilities to assist the nation in addressing energy, environment, infrastructure, and homeland security problems.

LANL is composed of more than 30 major organizations called divisions. Each division has a director, group leaders, and team leaders. The divisions partner with each other to provide program and environmental support.

The Engineering Sciences and Applications Division (ESA) is responsible for a budget of \$210 million. ESA employs 837 workers and is made up of 10 groups (see Figure 0-1). ESA's mission is the stewardship of nuclear weapons and enabling engineering technologies. Through innovative research and engineering, the division surveys and assesses the health of aging nuclear weapons. ESA ensures the safety and reliability of the nuclear weapons stockpile. The division develops and sustains capabilities to manufacture and process weapons components and manufacturing procedures. ESA also performs research and development in such areas as fuel cells and robotics.

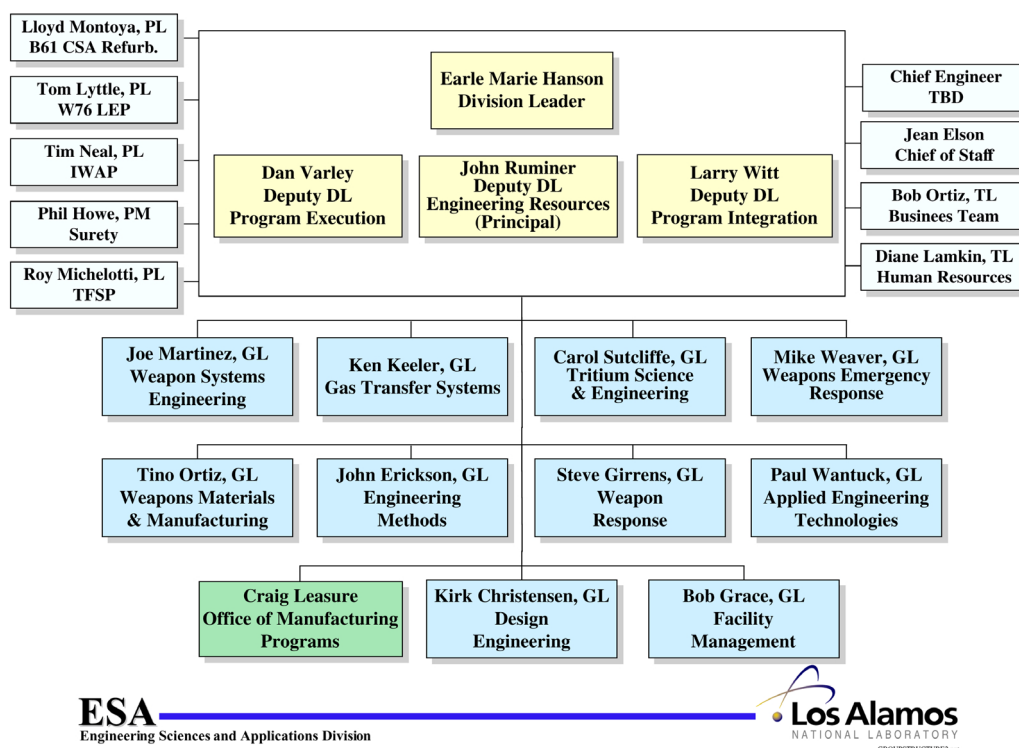


Figure 0-1. ESA Division organizational chart and environmental support partners

ESA maintains explosive machining facilities, electrochemistry facilities, environmental testing laboratories, explosive magazines, and special machine shops in addition to highly specialized areas such as the Weapons Engineering Tritium Facility, Fuel Cell Research Facility, the robotics laboratory, and the radiography laboratory. Environmental management is a core value at ESA Division and is subject to our continuous quality improvement (CQI) program. That is, feedback on our pollution prevention (P2) and energy efficiency (E2) efforts is incorporated into our key business processes, reinforces itself, and generates action plans.

See Figure 0-2 for a high-level process map of the ESA Division environmental management system. Our environmental management system is incorporated in the Laboratory-wide Integrated Safety Management (ISM) system.

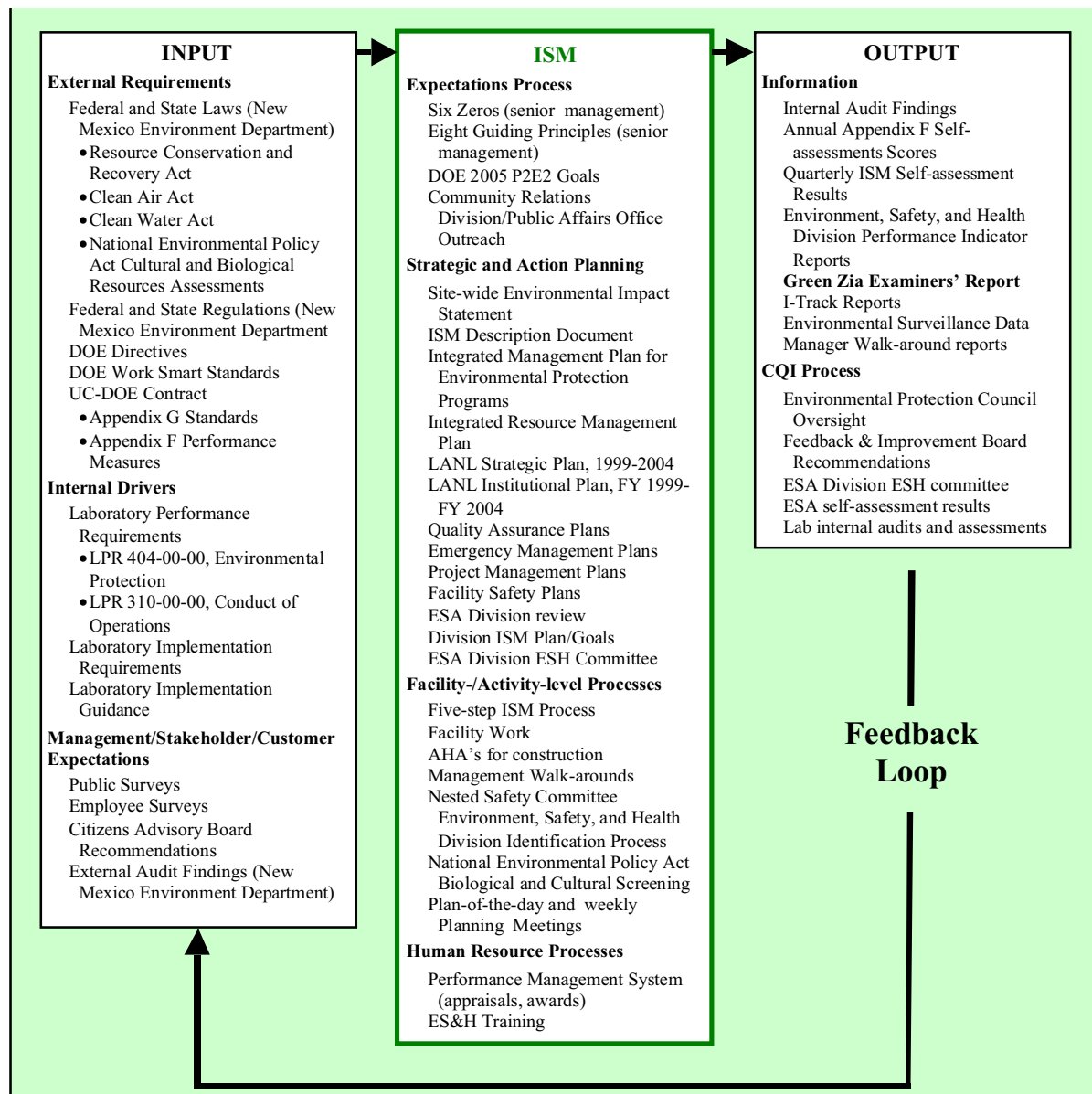


Figure 0-2. The ESA Division environmental management system

An inter-organization body at LANL, called the “E in ISM Team,” is specifically charged with promoting environmental values in the ISM system.

Federal regulatory agencies with environmental oversight for various LANL operations include the Environmental Protection Agency (EPA), the Defense Nuclear Facility Safety Board (DNFSB), the DOE, and the Nuclear Regulatory Commission (NRC). The New Mexico Environment Department (NMED) also oversees and regulates LANL activities. Many waste-management operations at LANL are governed by provisions of the Resource Conservation and Recovery Act (RCRA), the Air Quality Act, and the Water Quality Act. Further, the National Environmental Policy Act (NEPA) has mandated the development of the LANL Site-Wide Environmental Impact Statement (SWEIS).

LANL operations—including those of ESA Division—are shaped and evaluated by operating contract requirements negotiated by DOE, UC, and LANL. By agreement of the signatories, legal and regulatory standards are made a part of the contract by reference in Appendix G, as are work-related standards culled from, e.g., the Code of Federal Regulations, the American National Standards Institute, and the Uniform Building Code. Performance measures incorporated into the UC-DOE operating contract are contained in Appendix F and provide a broad range of specific goals, measures, and evaluation criteria. Appendix G standards and Appendix F performance measures are revised annually.

Appendix F serves as a key method of determining both customer expectations and organizational performance. Under Appendix F functional area 1, Environmental Restoration and Waste Management, performance measure 3.1.a, Tracking and Cost savings, and again under functional area 2, Environment, Safety, and Health, performance measure 1.2.c.1, Waste Minimization, Affirmative Procurement, Energy and Natural Resources Conservation, and Pollution Prevention, the contract explicitly calls out as a scoring criterion the application of Green Zia tools to identify P2E2 opportunities. Under functional area 3, Project/Construction/Facilities Management, performance measure 3.1.b, Accountability and Commitments, Appendix F enhances ISM environmental components by making managers accountable for implementing environmental management systems, leadership programs, and pollution-prevention audits, so as to meet requirements of Executive Order 13148, Greening of the Government through Leadership in Environmental Management, April 22, 2000. Item 3.1 and Table 3.1 provide additional details on the Appendix F process.

Regulatory agencies provide feedback on the Laboratory’s and ESA Division’s compliance with environmental requirements through external audits, a process that is often mediated by the LANL Environment, Safety, and Health Division (ESH).

But mere compliance is not LANL’s goal, nor is it ESA’s. Appendix F performance measures in the UC-DOE operating contract establish the goals that go beyond compliance, to P2E2 excellence. Feedback on appendix performance measures is provided by ESA Quarterly Appendix F Self-assessments, which, along with quarterly self-assessments from across the Laboratory, funnel into LANL Annual Appendix F Self-assessments, a process mediated by the high-level-management Feedback & Improvement Board (FIB). Ultimately, UC and DOE evaluate LANL’s Appendix F performance to determine whether provisions of the management contract are being met. In addition to Appendix F, ESA has established special environmental goals specific to the division operations.

0.2 CUSTOMER AND STAKEHOLDER REQUIREMENTS

The DOE, for whom UC operates LANL, is the primary customer for ESA Division. All products and services are designed, either directly or indirectly, to carry out that portion of DOE's mission assigned to the Laboratory. In addition, ESA Division has identified the following additional groups of stakeholders:

- Division employees,
- LANL customers, including technical programs and support divisions within the Laboratory, and
- Stakeholders such as UC and the surrounding communities and pueblos.

In addition to the measures included in Appendix F, ESA Division uses a variety of LANL institutional systems to structure our operations. LANL's ISM system, in its broadest definition, serves as a basis for the institution's environmental management. ISM, launched in 1996, is not fully implemented. However, founded on the CQI principle, the plan's existing gaps are systematically identified and addressed.

LANL's Performance Management System (see Item 5.1) assists leaders in establishing clear performance expectations for employees and ensures that those expectations are aligned with organizational goals and values. LANL mechanisms such as the annual Employee Checkpoint Survey and the Upward Appraisal Program also allow ESA leaders to evaluate customer/stakeholder satisfaction with division performance.

ESA performs a customer survey and reports yearly to a Division Review Committee made up of independent academic, government, and scientific experts.

Each group of stakeholders has a specific set of environmental expectations for ESA Division, as Table 0-1 shows. Those expectations inform our customers of our commitment to safe operations—including ergonomics—and efforts to minimize sanitary waste generation and resource consumption.

0.3 SUPPLIER AND P2E2-PARTNERING RELATIONSHIPS

LANL is aggressively moving toward enhancing the environment in the ISM system. Laboratory-wide P2E2 policy supports ISM. Because it is an integrated system, direct responsibility and accountability for managing the ESA Division's environmental, safety, and health (ES&H) practices are shared with other LANL partner organizations. Throughout this application, we identify where spheres of responsibility and accountability for division ES&H practices are shared. Accordingly, when application criteria present an area to consider, we cite not only our own activities but also relevant activities carried out by partner organizations.

More than half of LANL's \$1.667 billion budget is for the acquisition of goods and services necessary for operations. LANL's Business Operations Division (BUS) is responsible for the oversight of these major subcontracts. The division's key suppliers are the approximately 40 vendors managed by the Just-In-Time (JIT) Program, which accounts for 71 percent of all institutional procurement transactions annually and the labor contract companies who augment the workforce.

Table 0-1. ESA Division's Key Stakeholder Segments and Expectations Related to Environment

Stakeholder Segment	Key Environmental Expectations	Driver
Division Employees	<p>Provide a safe and healthy work environment.</p> <p>Help LANL meet key environmental goals.</p>	<p>Appendix F</p> <p>LANL Goals</p> <p>OSHA Requirements</p> <p>Protect the environment</p> <p>ESA ISM plan for self-assessments</p> <p>Management and employee walk-arounds</p>
Technical Programs and Support Divisions within LANL	<p>Use good business practices (cost effective, timely, productive).</p> <p>Help LANL meet key environmental goals.</p>	<p>Appendix F</p> <p>LANL Goals</p> <p>Laboratory requirements documents</p>
External Stakeholders (DOE, UC, the general public)	<p>Use good business practices (cost effective, timely, productive).</p> <p>Help LANL meet key environmental goals.</p>	<p>Appendix F</p> <p>DOE Orders</p> <p>OSHA Requirements</p> <p>EPA Regulations</p> <p>NMED Regulations</p> <p>EPA requirements</p>

BUS Division manages all supplier relationships under terms of the supplier contracts. Because key suppliers' performance directly affects the division and the entire Laboratory, quality expectations and performance requirements are clearly communicated. BUS Division representatives meet frequently and regularly with supplier representatives to evaluate performance and provide systematic, detailed feedback. One performance measure in Appendix F also measures BUS Division's ability to evaluate the overall performance of suppliers.

The Laboratory is moving in the direction of incorporating environmental components in many of the JIT product and labor contracts. Where applicable, BUS Division experts in affirmative procurement (purchasing recycled products) ensure that routine products conform to any applicable environmental provisions, such as recycled content. Examples of JIT contracts that include a recycling requirement include those for toner cartridges, photocopy paper, and daytime calendars. JIT contracts will soon be let for recycled latex paint and absorbents. In the first quarter of FY02, LANL achieved an affirmative procurement rate of 98 percent.

0.4 COMPETITIVE SITUATION

There are competitors both within the Lab and within the DOE complex that compete for programmatic funding or project-specific funding. Lawrence Livermore National Laboratory and Pantex are DOE facilities that compete for DOE monies. ESA is therefore required to find ways to justify operating expenses and improve processes to make maximum use of available funding.

Because both DOE and UC use the Appendix F measures to evaluate performance at all three research and development laboratories managed by UC—LANL, Lawrence Livermore National Laboratory (LLNL) and Lawrence Berkeley National Laboratory (LBNL)—the annual evaluations provide a means of comparing performance levels among the three institutions. Although not all Appendix F measures are applicable to all three laboratories, the side-by-side evaluation each year does provide useful relative information. Thus, as evaluated by key customers through Appendix F, both LBNL and LLNL can be generally considered competitors against which the Laboratory can benchmark its performance. Appendix F of the three UC-DOE laboratory contracts serves to standardize green requirements among these institutions and affects competition for funding.

0.5 STRATEGIC CONTEXT

Recent improvements to the institutional ISM system allow all LANL units, including ESA Division, to provide input to the Laboratory's identification of most significant environmental issues. Similarly, ISM allows key institutional environmental issues to become the focus of all work units, including ESA Division.

In addition, ESA has hired ESH professionals to work directly with operating divisions, making the process more effective. The relationships continue to build trust between the ESH professional and the operating groups and enhance the environmental compliance, environmental protections, and waste reduction.

ESA Division focuses on the following several environmental thrusts recently implemented across LANL:

- Recycling of unwanted mail through a process coordinated in BUS mail services,
- Reducing the use of paper through double-sided copying, use of recycled paper, and use of electronic documents,
- General recycling through increased emphasis on awareness programs,
- Achieving better energy efficiency through awareness and improved equipment purchases, and
- Reducing travel accomplished through carpooling, teleconferencing, and distance learning.

ESA specific projects are covered in the remainder of this application

1 LEADERSHIP

1.1 ORGANIZATIONAL LEADERSHIP

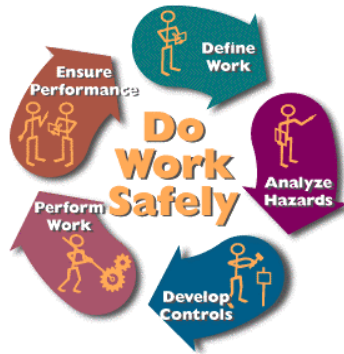
The leadership system that supports environmental excellence in ESA Division begins with the Laboratory director who in 1998 issued the Six Zeroes Vision for the Laboratory, which constitutes the institution's highest-level goals:

- zero injuries or illness on the job
- zero injuries or illness off the job
- zero environmental incidents
- zero ethics incidents
- zero people mistreatment incidents
- zero security and safeguards incidents

A comprehensive, ethics-based system cascades down from this leadership goal. ESA management includes a division leader, three deputy division leaders and 10 group leaders with an assortment of team leaders that focus on the various tasks and projects for which the division is responsible. The personnel in these leadership positions serve as champions on teams to ensure that employee performance plans are aligned with business plan goals and cascade information from management meetings to employees and teams.

ESA Division leaders and group leaders champion ES&H by participating on the division ESH Committee. This committee establishes environmental goals and environmental protection programs. The committee also reviews the status and quality improvement decisions. The ESA Division nested ESH committees flow down from the division ESH Committee and the permanent ad hoc subcommittees. Individual employees serve on teams and projects to implement environmental programs and then submit environmental improvement ideas to the division ESH Committee.

An integrating framework that ESA Division and LANL use as an environmental management system is ISM. The broad definition of "safety" encompasses all aspects of ES&H—including P2E2 and waste minimization (see Figure 1-1). The term "integrated" is used to indicate that the safety management system is a normal and natural element of the performance of work: safety is not a workplace add-on;



1. Define Scope of Work

1. Translate the scope of the project into work.
2. Set performance expectations.
3. Prioritize tasks and allocate resources.
4. Establish environmental regulatory requirements and expectations

2. Analyze Hazards

1. Identify and analyze the hazards, **including environmental hazards.**
2. Identify appropriate standards and requirements, including environment.

3. Develop and Implement Controls

1. Evaluate engineering, materials substitution, personal protective equipment, and other controls.
2. Obtain permits or other authorization needed to **assure environmental and safety requirements** are fulfilled.
3. Identify and implement needed controls to prevent and control hazards and environmental pollution.
4. Establish a safety envelope.

4. Perform Work

1. Confirm operational readiness.
2. Perform the work safely and environmentally compliant.

5. Ensure Performance

1. Seek and collect feedback from employees.
2. Identify opportunities for improving performance.
3. Implement changes to improve performance.
4. Reinforce smart work practices.
5. **Hold employees accountable** for their performance.

Figure 1-1. LANL's five-step process for ISM

it is how LANL does business. ISM supports LANL's goal "to accomplish its mission cost-effectively while striving for an injury-free workplace, minimizing waste streams, and avoiding adverse impacts to the environment from its operations." ISM implementation is a major emphasis at LANL, and senior leaders formally review progress toward full implementation on a quarterly basis.

Each year ESA leaders develop a detailed ISM Implementation Plan that ties directly to the overall LANL ISM Description Document. This document describes ESA's vision, responsibilities, expectations, and goals to achieve integrated safety management. In the 2001 ESA Division ISM Implementation Plan, leaders established the ES&H goals for the following year.

Specific environmental areas that were identified as priorities through the ISM Plan include the following:

- NEPA evaluations,
- PCB-containing equipment elimination,
- NPDES performance,
- Waste minimization and recycling,
- Review of control systems, and
- RCRA self-inspections.

The ISM Project Office has established a detailed implementation schedule, available on an employee-accessible web site and monitors all portions of the Laboratory, including ESA Division, to ensure that milestones are achieved and that performance goals are met. ISM featured two enhancements in 2001: reference to ISO 14000 series requirements for environmental management systems and implementation of ISM Self-assessments.

Each quarter, ESA Division prepares a self-assessment against ISM requirements and established goals, through which the division establishes priorities, including those relating to P2E2. For example, during the most recent self-assessment in FY02, ESA Division found that the goal to be PCB-free is ahead of schedule. ESA self-assessments also indicated that the Natural, Biological, and Cultural (NCB) project reviews are improving and the number of RCRA concerns are decreasing.

Another feature of ISM is the institutional Safety Concern Program (SCP), a no-fault partnership between workers and managers to identify and resolve safety concerns. The program is designed so that managers receive electronic notification of the safety concern, and the submitter receives periodic updates as the concern is tracked to resolution and closure. In addition, employees and team leaders in the division use the nested safety committees to report and correct ES&H concerns. Employees are also encouraged to report concerns directly to their managers or the ESH professionals.

The ISM system includes Laboratory Performance Requirements (LPRs), internal requirements governing the performance of work that are drawn directly from legal or contractual regulations. LANL has grouped the LPRs into six categories, including worker health and safety and environmental protection. Laboratory Implementation Requirements (LIRs) stem directly from the LPRs and provide detailed mandatory implementing requirements for the safe and environmentally responsible performance of work. Laboratory Implementation Guidance documents provide detailed recommendations on procedures for putting LIRs into practice. (See Figure 0-2).

LIRs also define the responsibility for P2E2. Waste minimization plans are prepared for all large construction projects. Two ESA building projects implemented these plans. The waste management LIRs require that each generator minimize their waste through substitution and recycling. Generators are assisted by highly trained waste coordinators who identify opportunities for waste minimization and recycling. ESA personnel have been selected for P2E2 awards and ESA projects have obtained P2E2 funding for a number of projects. Some of these projects are discussed in Section 7.

ESA's management is committed to frequent and open communication with employees and stakeholders. The division and groups regularly hold meetings with all employees on environment and safety expectations and goals. These meetings include sessions on Integrated Safety Management (ISM), which involve a management commitment and worker involvement to perform work in a safe manner and that protects both the workers and the environment. In addition to the all-employee meetings, ESA reinforces the safety and environment focus by hosting weekly managers' meetings at which environment, safety, and health performance is a standard agenda item. The management team reviews employee input from the nested safety committees that has been reported and discussed.

Division managers guide the organization by advocating uncompromising safety, by promoting P2E2 and resource conservation, and by recognizing and rewarding innovation and efficiencies in productivity. ESA Division establishes both processes and behaviors to eliminate environmental incidents. These are formalized in the ESA ISM Quarterly Self-Assessment. Some of the pertinent goals are:

- Review new and modified activities for ESH concerns and NEPA compliance. Poll all team leaders quarterly to identify planned new or modified operations for the quarter and prepare NEPA documents.
- Meet the Laboratory's goal to be free of all PCB items by the mid-year 2003.
- Continue the downward trend in the number of RCRA self-assessment findings.
- Continue the downward trend for the number of NPDES exceedances
- Managers shall perform at least one walk-around per month.

Line managers are directly responsible for meeting these goals (see Figure 2-2). This commitment is further emphasized by the goals stated in the ESA Division Plan for Integrated Safety Management, Integrated Safeguards & Security Management, and Plan for Self-Assessment. The methods outlined in the plan to accomplish safety and environmental protection responsibilities are based on the guiding principles of:

1. Management commitment and worker involvement,
2. Line management responsibility,
3. Clear roles,
4. Competency commensurate with responsibility,
5. Balanced priorities,
6. Identified standards and requirements,
7. Work-tailored controls, and
8. Authorized operation.

Senior division managers and group managers are members of the ESA Division ESH Committee. This committee is chaired by the Division Leader and meets on approximately a monthly basis. Standing subcommittees are comprised of line managers as well as non-management employees.

ESA leadership conducted and documented 470 management safety walk-arounds in 2001. A safety walk-around provides management a direct interaction with employees and their daily tasks. Information regarding goals and progress is related to employees in regular one-on-one meetings with individuals when managers walk their spaces. All managers observe an open-door policy and use a variety of tools to communicate with employees and receive their feedback. These informal but structured reviews allow leaders to observe working conditions throughout their areas of responsibility, to talk informally with employees, and to note potential areas for improvement. LANL has created nine categories of guidance cards, including environmental protection, that provide suggestions on the types of observations managers should make during walk-arounds. Walk-around findings in the environmental category are tracked and analyzed by means of a web-accessible database called I-Track. The findings are then reported to the most senior LANL managers by the Associate Director of Operations.

Division managers and employees meet annually with a Division Review Committee. Independent, academic, government, and scientific experts comprise the committee that reviews the mission, goals, and progress of ESA Division. In the past two reports, ESA received an "Outstanding" for Integrated Safety Management.

The committee gave us the following grades for this year:

- Overall Grade: Outstanding
- Relevance to National Needs/Mission: Outstanding
- Quality of Science and Technology: Outstanding/Excellent
- Programmatic Performance: Outstanding
- Management of Major Facilities: Outstanding
- Division Management: Outstanding

Most recently, the committee was particularly impressed with ESA's outstanding safety record, the high quality of our people, the way we have restructured to integrate our new program responsibilities, our Five-year Facilities plan, and the excellent engineering products that we provide for the nation. They strongly applauded the quality initiatives we have put in place in the areas of project management, resource allocation management, engineering, and the use of the Engineering Assessment and Certification Procedure in guiding our technical decision process for the weapons-life extension programs. We need to fully integrate our quality initiatives and formal engineering procedures into our product delivery.

An additional number of leadership systems are in place to motivate staff and improve performance. ESA managers and team leaders frequently use the Laboratory's employee awards program. Some of the awards have gone to exemplary employee suggestions such as the uranium chip reduction process for the TA-3 machine shops and the coolant reduction in the TA-3 machine shops. Other awards have been given to the improvement of the treatment of high-explosive wastewater and the use of propane rather than wood to remove HE-contamination at the TA-16 burn ground.

Information regarding organizational goals and current progress cascades to individual employees through the management structure. At ESA all-hands meetings, group leaders hold regular meetings with their staff to discuss programmatic issues. ESA Division also maintains a Website with a wide range of detailed information for employees, customers, and stakeholders.

ESA Division is fully committed to continuous improvement of all its operations. Such improvements usually include, either directly or indirectly, a reduction of waste generation or a decrease in needed resources.

Division managers set organizational direction at ESA strategic planning sessions (see Item 2.1). These sessions include a review of data and evaluation of past performance, including safety and environmental performance. The division's strategic goals, action plans, and targets derive from the needs and expectations of all key customer groups, as determined from LANL goals, Appendix F contractual performance measures, and division performance results.

The planning process used by ESA managers employs a line-of-sight process from high-level organizational goals to individual performance expectations. Group leaders develop group-level plans to support our goals. Using LANL's Performance Management System (see Item 5.1), managers then work cooperatively with employees to identify how each individual in the program is expected to contribute to the vision. This methodology has become a cornerstone for the operations within ESA Division. This process has educated the workers who now identify and report environmental concerns.

The E2 ethic has achieved acceptance at the division. The division ensures that all new computers, copy machines, and other office equipment are equipped with Energy Star, an energy saving function that turns off the device when not in use. ESA has also installed energy saving switches that turn off lights in rooms when motion detectors show no activity for a set duration of time.

LANL employees are keenly aware of transportation issues and the need for reducing travel. The Laboratory actively promotes carpooling by establishing reserved parking for high-occupancy vehicles in congested areas and maintaining a web page, <http://www.lanl.gov/orgs/pa/News/rideshare.html>, to facilitate contact among prospective carpoolers.

Teleconferencing is similarly promoted at http://int.lanl.gov/orgs/ccn/computingatlanl/bits/97october/Delores_VTC.html. Distance education by means of teleconferencing, correspondence courses, and especially web-based learning is a prominent feature of training and professional development programs at LANL. Telecommuting capability for LANL employees is somewhat restricted for security reasons, but the Computing, Communications, and Networking Division Network Engineering Group makes accommodations on an as-needed basis.

The ESA environmental management system has posted a number of successes and sparked several P2E2 initiatives. The results of some of our successes are discussed in Category 7. Some recent instances of the extent to which the P2E2 ethic now governs work at ESA are:

- Improving chemical storage to reduce spill potential;
- Voluntarily replacing mercury-containing fluorescent lightbulbs with non-mercury lightbulbs, thus reducing hazardous waste;
- Obtaining DOE funds, with the help of the LANL P2E2 office, to separate stormwater and industrial water at the TA-11 drop pad to improve treatment of the industrial water;
- Increasing cardboard recycling stations by 30 percent;
- Recycling approximately 3 tons of lead no longer needed for ESA operations;
- Retiring PCBs capacitors to reduce ESA's liability in case of fire;
- Changing high explosives (HE) treatment methods so that the metal could be recycled rather than landfilled as a New Mexico special waste;
- Reducing ash (a New Mexico Special Waste) from the TA-16 Burn Ground by replacing wood with propane as the fuel for flashing HE-contaminated materials;
- Recycling of lead solder from electronics operations;
- Replacing a below-ground gasoline storage tank with an above-ground tank and exploring the use of alternative fuels such as ethanol for ESA vehicles;
- Installing oil collectors for air compressor blowdown;
- Identifying sources of cooling water that can be eliminated to reduce the number of outfalls and seeking funding for those projects;
- Converting from chemical film development to digital radiography at the HE complex; and
- Developing a plan to consolidate engineering activities to reduce space needs about 300,000 square feet, with resultant energy savings.

Some of the awards have gone to exemplary employee suggestions such as the uranium chip reduction process for the TA-3 shops, the coolant reduction for the TA-3 shops, improving the reduction in use and recycling of HE-contaminated activated charcoal. Another project, the High Explosives Wastewater Treatment Facility (HEWTF) won a national DOE award. In 2001, the ESA Division Office sponsored a get-together with all of the Green Zia participants to thank them for P2E2 efforts. Also, a group within ESA gave a group monetary award to one of the waste coordinators (even though the coordinator was not in their group) who had contributed to their P2E2 efforts.

1.2 COMMUNITY LEADERSHIP

ESA is committed to the success and viability of its community partners. Division management believes that informed employees are the best ambassadors for the Laboratory because it is the employees keep the community informed in an informal method.

ESA's commitment to community leaders is evident. ESA hosts an annual visit to Nake'muu, an ancient ancestral home of the people from San Ildefonso Pueblo that is located in an ESA operational area. It is one of the few standing-walled ancestral pueblos remaining in the Jemez Mountains and has survived the natural elements for more than 700 years. The site was a refuge during the Pueblo Revolt. Pueblo elders have told stories of traveling the canyons to the Valle Grande and staying at Nake'muu. Information on the site has been passed down from generation to generation via oral history and traditional songs. Pueblo leaders annually visit the site to personally evaluate the changing condition.

ESA managers and employees also participate in the community's events such as the community tree-planting efforts to reforest the area after the fire and the Laboratory-wide Science Education Program. In 2001, ESA employees contributed more than \$43,000 to United Way. ESA also participates in community programs like the Special Olympics. ESA has also participated in emergency response training for Native Americans in Arizona.

ESA supports the community by maintaining a unique relationship with a local community college. This provides educational opportunities for interested students and a job pool for the Lab. This process helps ESA remain staffed and helps support the local economy by providing quality education and good jobs. ESA started the Machinist Apprenticeship Program at Northern New Mexico Community College in August 1999 when the division realized that its capable machinists were retiring. ESA officials who rely on this expertise realized that replacing this capability was difficult. Through the support of ESA employees, the program trains students to become journeyman machinists. The program provides 8,000 hours of training that takes four years. The program was restarted after several years of being inactive due to funding cuts. ESA has donated more than 20 machines and additional equipment worth nearly half a million dollars to give the students "hands-on" learning tools.

ESA management have encouraged the division officials to submit for the Green Zia award for the second year, a further demonstration of commitment and zeal in the environmental arena.

Because it is part of the larger LANL organization, ESA Division has limited interaction with the public on environmental issues. LANL has designated the Community Relations Office to routinely handle interactions with the public. Presentations, discussions, and workshops specifically focused on environmental issues are typically coordinated through ESH Division or the Environmental Science and Waste Technology Division (E). Other community interactions take place through the many integrated outreach programs of LANL. ESA Division is involved and/or represented in all of these institutional outreach activities.

The Northern New Mexico Citizens Advisory Board is a community advisory group that provides advice and recommendations to the Environmental Management sector of DOE about environmental restoration and waste management at LANL.

Two ESA personnel participated in the Integrated Resource Management Plan (IRMP) and were instrumental in setting a more aggressive energy and water conservation policy than was originally supported by the IRMP planners. These plans will support LANL's other water quality conservation efforts. LANL representatives chair and provide technical support the Governor's Blue Ribbon Task Force on Water and the Jemez y Sangre Water Planning Council. Executive Order 99-35 established the Blue Ribbon Task Force on Water to investigate current water policies and laws within New Mexico.

A key aspect of LANL procurement, including that of ESA Division, is to support, whenever possible, local vendors, especially small businesses and those owned by minorities and women. The BUS Division Small Business Office (SBO) has in place a number of programs that support small business and economic development in the region. Some of the programs include the Northern New Mexico Preference Program, part of Los Alamos' Regional Purchasing Program designed to strengthen regional business enterprises, stimulate greater regional employment and infrastructure, increase the business tax base in Northern New Mexico, and reduce regional dependence on the federal government. SBO this year also established the Historically Underutilized Business Program and has hosted several regional trade fairs to bring together small business owners with government and Laboratory procurement officials.

Each year, SBO establishes socioeconomic goals and northern New Mexico procurement goals. In FY01, LANL's procurements in northern New Mexico totaled \$357 million—\$11 million more than in FY00 and \$166 million more than in the DOE benchmark year of FY96. Whenever possible, ESA Division attempts to purchase materials locally. ESA spent nearly \$19 million on purchasing goods and services last year. More than \$7 million or 37 percent was spent in New Mexico. Of that \$7 million spent in New Mexico, ESA purchased more than \$3 million worth of goods from Northern New Mexico businesses.

SBO has conducted a number of workshops and training sessions for small businesses interested in doing business with the Laboratory. SBO provides guidance to these businesses regarding such matters as establishing proactive P2E2 programs and using/providing products with recycled content.

ESA buys more than 50 percent of all office products from green suppliers. Last year, ESA purchased more than \$99,000 worth of recycled paper out of \$146,000 spent on paper and paper products. ESA managers regularly meet with the Laboratory's procurement officers to discuss the design and delivery of needed goods and services and the possibilities of procuring products from Northern New Mexico businesses.

ESA Division also contributes to LANL's highly successful environmental initiative Mail Stop A1000. This is an effort to recycle unwanted junk mail and other printed material. Division employees re-address unwanted mail to MS A1000, and LANL mail delivery personnel collect and sort the material as part of their normal mailroom activities. In FY00, the program recycled 212 tons of material and 397 tons in FY01. This program has received wide publicity both inside and outside LANL and in 1999 received a White House Closing the Circle Award. The Closing the Circle program, now in its sixth year, recognizes federal employees and their facilities for efforts that result in significant positive impacts on the environment in waste prevention, recycling, affirmative procurement, model facility demonstrations, and promoting change.

Much of the material recycled through Laboratory P2E2 initiatives (Items 0.3 and 3.1) is handled by the Nambé Recycling Facility, in partnership with LANL and LANL's support services subcontractor, Johnson Controls of Northern New Mexico (JCNNM). The Nambé Recycling Facility, based in nearby Nambé Pueblo, is a Native American-owned company that annually processes 5,000 tons of concrete and asphalt, 350 tons of paper products, all types of glass, plastic types 1 and 2, and scrap metal.

The Laboratory and UC support at least 14 community outreach programs in Northern New Mexico, some implemented by the Community Relations Office, others by such diverse entities as Environmental Restoration Project Outreach and the Tribal Relations Team. Virtually all organizations at the Laboratory are involved in outreach to some extent, with activities ranging from highly technical to charitable.

ESA recently won a Laboratory Pollution Prevention Award by recovering waste oil. In the past, waste oil from high-explosives machines was burned as a hazardous material. New evaluations confirm that the oil can be carefully removed without contaminating it, and the waste oil no longer meets the definition for reactivity. This process revision saves 250 to 330 gallons of waste oil annually.

ESA also won a P2 award for the reconfiguration of the High Explosive Wastewater Treatment Facility. This facility has changed from batch operations to continuous re-circulation of wastewater. The switch reduces the need to change the activated carbon as frequently, saving approximately \$30,000 per year and reducing the possibility of the facility exceeding NPDES limits. Use of a treatment/reclamation facility also helps reduce the amount of waste generated by approximately 8,000 pounds per year.

Another P2 award was given for eliminating waste from the machine shop. The single largest generator of machine coolant waste was in the ESA's main machine shop. In FY98 the shop implemented a zero-waste strategy and waste generation dropped from 14,000 kilogram annually to 4,000 kilogram. In FY99 the shop installed an evaporator to deal with the water that is the main constituent in spent coolant. The remaining oil is recycled, and the waste stream has now been nearly eliminated. This project is being used by P2E2 as a success story to encourage other Laboratory shops to recycle coolant.

ESA also develops environmentally responsible projects independent of the Laboratory's P2E2 program. For instance, ESA set a goal to remove PCB-containing capacitors ahead of the Laboratory schedule and funded the removal. ESA also decided to replace its mercury-containing light bulbs with non-hazardous bulbs, again with ESA funding. ESA is now in the process of designing a chiller to replace a source of once-through cooling water and an inefficient cooling tower, saving considerable amounts of water at our shop facility. ESA is also an active participant in Laboratory-wide projects that reduce waste. In this capacity, ESA acted as the pilot and provided staff to help manage timber thinning after the Cerro Grande fire. Instead of slash burning all wood (the previous practice), logs were sold, smaller wood was prepared for firewood, and wood too small for firewood was burned in special air curtain destructors.

2 PLANNING FOR CONTINUOUS ENVIRONMENTAL IMPROVEMENT

2.1 STRATEGIC PLANNING FOR ENVIRONMENTAL IMPROVEMENT

LANL has developed and uses as a guiding blueprint the Laboratory Strategic Plan, 1999-2004 (available at <http://www.lanl.gov/orgs/pa/News/StrategicPlan99.html>). The current LANL strategic plan sets out major programmatic objectives and strategies. It also identifies environmental objectives related to most major LANL goals. In addition, a major objective of demonstrating operational excellence in all activities specifically calls out the following strategies:

- Achieve measurable improvements in safety and environmental stewardship through full implementation of ISM [which includes P2E2] throughout LANL.
- Manage wastes and hazardous legacy materials effectively and accept the challenge of minimizing the generation of hazardous wastes in the future, with a long-term direction toward zero emissions.

Each year LANL also produces an institutional plan, a five-year perspective on LANL operations. The Institutional Plan FY 1999-FY 2004 (available at <http://lib-www.lanl.gov/documents/l/00326439.pdf>) identifies strategic requirements for LANL organizational units, including ESA Division; summarizes strategic, tactical, and programmatic plans; and helps ensure the integration of LANL activities with DOE priorities.

Finally a cross-functional team of Laboratory employees, experts in subject matters related to environmental performance, meets annually to identify and set priorities for the institutional environmental performance. This process, based loosely on ISO 14001 principles, includes aspect identification and the creation of draft targets and objectives for improvement efforts. This information is then transmitted to the Laboratory's Safety Function Manager for the Environment, who prepares an annual summary of environmental concerns that is transmitted to senior Laboratory management for action. The goals established by this process are then assigned to LANL organizations called Issue Teams, which develop action plans, report planning status monthly to the E in ISM Team, and track implementation progress. The significant environmental issues addressed by these teams in 2001-02 are water conservation, elimination of ozone-depleting substances, reducing RCRA hazardous chemicals, and fire prevention.

Based on LANL strategic directions, high-priority environmental improvement goals, and DOE requirements, ESA Division then develops its own strategic plan. The division sets strategic direction by using the eight steps listed in Item 1.1. Environmental goals are implemented by the ESA Division nested ESH Committee (Division ESH Committee and its permanent and ad hoc subcommittees). This committee serves as an integral link between management and employees and demonstrates management commitment and ESH Involvement. ESH is the first item on the agenda at biweekly division management meetings.

The division maintains a strong internal ESH support team made up of ESH professionals who provide support in environmental compliance, waste management (including P2E2), radiation worker safety, occupational and high explosive safety, and emergency preparedness. This team provides ESH expertise to support group leaders and their staff. ESA supports the participation of the ESH staff in Laboratory initiatives. ESA measures the success of our environmental program through the ESA ISM and ISSM Self-Assessment plan.

Figure 2-1 gives an overview of the ESA strategic planning process, which includes input from each of the following:

- Institutional strategic goals and objectives,
- Past performance, as documented through such activities as ISM walkarounds (see Item 1.1), as well as results from process improvement efforts other operational results (see Category 0),
- General and specific measures from Appendix F that influence ESA focus (see Item 3.1),
- Employee feedback gathered through LANL's annual Employee Checkpoint Survey and the LANL Upward Appraisal Program,
- The ESA advisory committee that provides additional data on best practices and industry standards,
- Requirements contained in LIRs and LPRs,
- Quality assurance, and
- Employee feedback gathered through the nested safety committee or directly to management or the ESH professionals.

In addition, through senior leaders' negotiations and assessments with DOE and UC stakeholders, ESA managers get a clear perspective of how stakeholders view our performance against LLNL and LBNL in the competitive environment (to the extent our fellow national laboratories can be considered competitors).

Based on these tenets of the Laboratory-wide plan, ESA leaders have developed a division plan for ISM. The ESA division-wide ISM plan also demonstrates that safety reigns supreme over programmatic work. All workers have the ability to stop work if they believe it is being done in an unsafe or environmentally harmful manner.

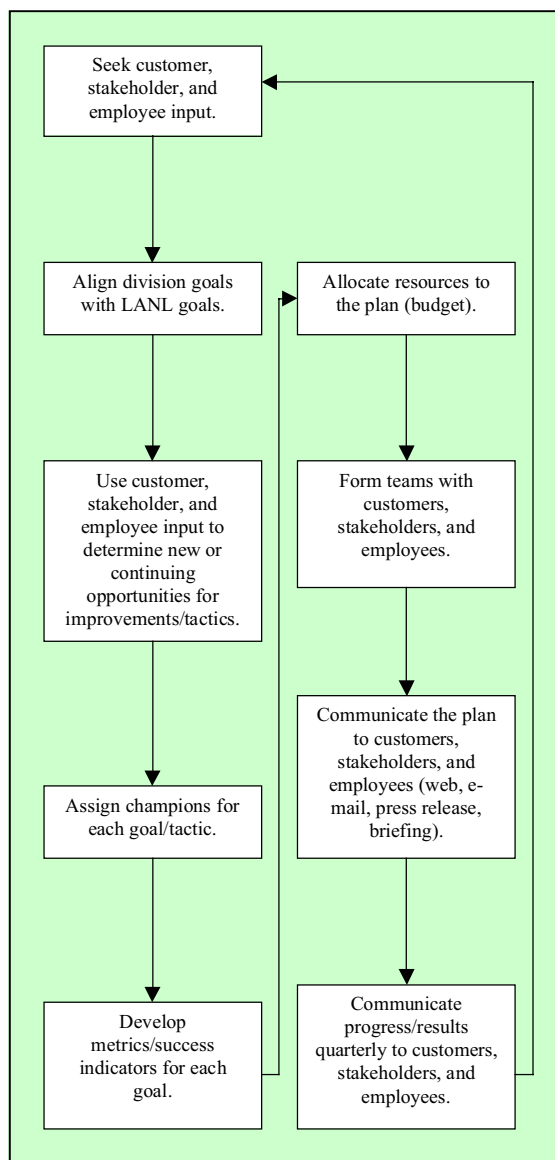


Figure 2-1. ESA Division's strategic planning process

The division plan is designed as a tool for management to periodically review the effectiveness of ISM implementation in ESA Division. ESA management reviews the assessment quarterly to foster continuous improvement in the application of security, environment, safety, health, and management programs. An overview of the ESA strategic planning process is in Figure 2-1.

Another strategic plan is the Site-Wide Environmental Impact Statement (SWEIS). The Laboratory spent more than \$30 million and many years researching, preparing, and publishing the document. ESA division staff worked for several years to provide division-related information on how ESA operations might affect air and water quality; cultural, biological, and ecological resources; and regional health and socio-economics. ESA provides yearly input to update this document.

2.2 ACTION PLANS

There are many plans that impact the work that ESA division conducts for the nation. The cornerstone plan for a key ESA nuclear facility is the Documented Safety Analysis (DSA). ESA division personnel recently published the DSA for the WETF. The document was more than 1,500 pages and represented years of research and documentation to establish the envelope that the facility can operate safely in with respect to the public and the environment. The document includes a description of the conditions safe boundaries and hazard controls that provide the basis for ensuring safety. The DSA postulates different accident scenarios and how they can be managed or mitigated in order to protect ESA workers, the general public and the environment.

There are many other plans that are site-specific. The following is a partial list:

- ISM and ISSM Plan
- Fall Protection Plan,
- Fire Protection Plan,
- Industrial and Radiation Monitoring Plan,
- Procurement Procedure,
- Storm Water Pollution Prevention Plans,
- Seismic Monitoring Plan, and
- Detailed Operating Plans.

Hazard Control Plans (HCPs) are additional planning tools that cover all work from office to industrial activities. Employees are directly involved in writing HCPs while management is responsible for proper implementation of the plans. These plans identify ES&H concerns and the controls required to protect employees and the environment.

ESA also uses a self-assessment tool to track results throughout the division. This process measures environmental performance, waste minimization, management safety walk-arounds, hazards analysis and controls, injury and illness prevention, and other metrics. All managers can evaluate the data. The self-assessment tool provides feedback to ESA and Laboratory senior management about what problems need attention so that ESA can allocate funds and remedy identified problems.

To ensure the safety of ESA's workforce and compliance with the laws and regulations, ESA staff members have also developed many other plans such as

- Facility Management Plans,
- Configuration Management Plans,
- Facility Safety Plans,
- Quality Assurance Project Plans,
- Emergency Action Plans,
- Health and Safety Plans,
- Administrative Procedures,
- Training Program Description and Job Analysis, and
- Spill Prevention Plans.

Participation in the New Mexico Green Zia Environmental Excellence Program this year, with accompanying development of appropriate measures and performance indicators, is another key element allowing the division to incorporate environmental focus into long-range plans. The exercise will provide ESA Division an annual third-party, independent evaluation of successes and opportunities for improvement in environmental performance. ESA managers reviewed the strengths and opportunities for improvement identified in the Green Zia feedback reports. These reports were used as a feedback tool to improve environmental performance.

DOE exercises high-level input into LANL strategic planning by means of the Integrated Resource Management Plan (IRMP), a strategy identified in the 1999 SWEIS to mitigate the environmental impact of operating the Laboratory. IRMP specifically addresses groundwater and watershed protection, air quality, energy consumption, waste management, and cultural-resource oversight. Two ESA personnel participated in the IRMP and were instrumental in setting a more aggressive energy and water conservation policy than was originally supported by the IRMP planners. Full integration of IRMP and ISM is slated for October 2002.

After identifying goals, ESA Division develops P2E2 actions, targets, and measurements of success, as shown in Figure 2-2. Because managers and employees recognize that inefficiency leads to waste, there is an ongoing effort to improve operations. These improvement efforts include action plans, which are regularly reported to management and tracked for successful completion.

Involvement in the Green Zia Environmental Excellence Program has also led to an increased awareness of environmental concerns across the organization. Additionally, ESA Division's ISM quarterly self-assessment and implementation strategy for ISM focuses on how to involve all employees in making environmental improvement a routine part of all operations. In combination with the leadership systems previously described, these efforts also contribute to the development and execution of action plans.

Division-level ISM quarterly self-assessments demonstrate management ownership and accountability. To perform a credible self-assessment we identify the sources that provide relevant information. These sources include subject matter experts, and pre-existing data sources such as occurrence reports, accident reports, and management walk-around findings. The focus of the self-assessment is on functionality, which usually requires direct observation of work. The results of self-assessments are documented and disseminated to the ESH Division Performance Indicator Group (ESH-PI) and upward to the division's Laboratory directorate. A significance category is assigned to each issue identified. To ensure that our line managers act on results, FIB provides feedback to the division.

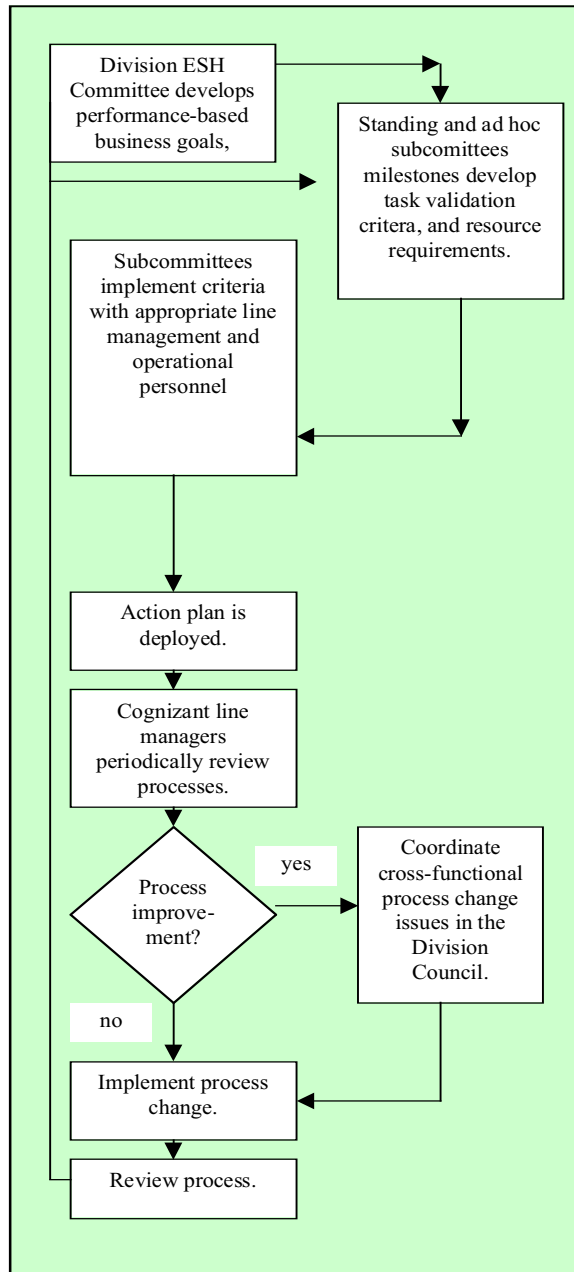


Figure 2-2. ESA Division's process for deploying and tracking action plans

The ESA Green Zia Team (see Figure 0-2) is responsible for assessing action plans, both with a view to regulatory compliance issues and to environmental excellence beyond mere compliance. The team's recommendations are incorporated into the planning process at the points corresponding to the top three boxes identified in Figure 2-2. The submission of the Green Zia award application is part of an ongoing division effort to more effectively and systematically focus on environmental performance.

2.3 INTEGRATION AND IMPLEMENTATION

A critical high-level driver is DOE Acquisition Regulation 970.5204-2, Integration of Environmental, Safety and Health into Planning and Execution. Certain key provisions of this acquisition regulation affect LANL operations in fundamental ways. These provisions mandate that LANL must do the following:

- Adopt seven guiding principles of safety management that is fully integrated, Laboratory-wide,
- Integrate environmental protection into the concept of safety,
- Integrate environmental issues into hazard analysis, and
- Adhere to DOE Work Smart Standards for worker, public, and environmental protection.

To the seven guiding principles mentioned above, the Laboratory has added an eighth—management commitment and employee involvement. The result is ISM (Items 1.1).

Appendix G of the UC-DOE operating contract is the main mechanism that integrates ESA strategic P2E2 planning—and strategic P2E2 planning in other divisions—with strategic planning Laboratory-wide.

Appendix F of the contract is the main mechanism that integrates ESA's ESH performance—and the performance of other divisions—with Laboratory-wide performance measures. The negotiation steps for Appendix F measures, the process to set priorities, the improvement steps, and the resulting evaluations (see Figure 2-3) all help focus ESA resources on key business practices and improve operational quality.

The Appendix F process features quarterly division-level self-assessments, which are rolled up into an annual Laboratory-wide self-assessment (distinct from annual ISM Self-assessments) and evaluation by both UC and DOE. In connection with quarterly self-assessments, ESA senior leaders meet with UC and division review committee representatives to discuss current progress against goals and to identify any issues. Senior leaders also interact more often with DOE and UC customers on an as-needed basis. The regular and frequent interaction helps prevent surprises, mitigate problems, and create a cooperative rather than an adversarial atmosphere.

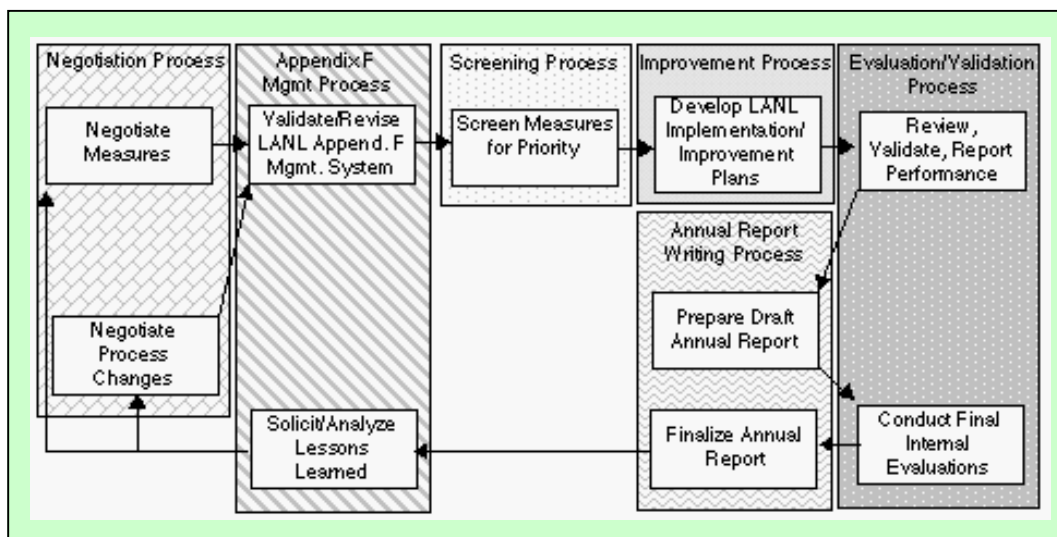


Figure 2-3. LANL Appendix F process (18-month continuous cycle)

Section C of Appendix F contains about 60 operations and administration criteria—further broken down into specific performance measures—in nine functional areas. During the annual Appendix F assessment and appraisal process, examiners assign a score to a given performance measure according to a quantifiable “gradient.” The quarterly self-assessments allow managers to track resource allocations and to make any necessary adjustments to either funding or human resource allocations.

The reader may consider the integration and implementation of all these plans as a bit daunting, but the plans represent a process that is integral to assuring that very high quality work is being done safely: work that often involves using hazardous materials and is sometimes performed under hazardous situations. These plans represent a Laboratory and ESA division commitment to workers, the public, and the environment.

The success of the action plans is tracked in a number of ways. ESA management walk-arounds ensure that managers and supervisors are walking their spaces and watching workers perform their work according to their HCPs and in accordance with Appendix F measures. The walk-around database is World Wide Web accessible for recording observations and tracking corrective actions. The database also serves as an avenue to focus senior manager attention when needed.

Another implementation tool is the Laboratory’s Safety Concern Program. The program is a no-fault partnership between employees and their managers. Workers, including ESA employees, electronically submit any environmental compliance or safety concern they might have regarding their workplace. The employee’s line manager receives an email notification that a safety concern was submitted that the manager is responsible for resolving the problem. The employee who submitted the concern is then provided periodic electronic updates on the progress of the resolution.

The ESH-ID is another tool that ESA managers and employees use to identify regulatory requirements and track hazards. Project descriptions are provided and air, water, and wastes are described on a Web-based form. The ESH-ID is distributed for review to all pertinent ESH groups, including P2E2. Steps can be taken before the project commences to protect health, obtain permits, and minimize wastes. Whenever a project changes, this process is reapplied.

When the ESH-ID identifies that there are possible environmental issues, more complex documents are prepared. An Environmental Assessment (EA) is developed for projects with minor impacts or an Environmental Impact Statement (EIS) for projects with potentially significant impacts. For example, ESA partnered with DOE and other LANL groups to prepare an EA for the new Engineering Complex. The EA addressed impacts of the complex on waste, energy, air and water quality, cultural resources, traffic, and human health. The net effect of the project had environmental benefits such as reducing energy demands and decreasing water and air quality impacts due to modernizing equipment and reducing the size of faculties. The EA also analyzed the siting of new buildings to address geological conditions and legacy contamination. It was discovered that one of the buildings would have been built on a fault in an area with legacy contamination. As a result, the building was sited in another location. This document is currently out for public review.

LANL provided more than \$20 million dollars to fund a DOE contractor to prepare a Site-Wide EIS to cover all operations at the Laboratory prior to 1999. The EIS addressed impacts of Laboratory operations on land resources, geology, water resources, air quality, ecological and biological resources, human health, environmental justice, cultural resources, socioeconomics, infrastructure, and waste management. This multi-year project involved DOE, various contractors, operating divisions, and the public.

ESA employs eight environment, safety, and health (ESH) experts and two waste management coordinators who assist employees with health, safety, and waste issues and bring any problems to a manager's attention. The ESH team works with project leaders early in the development of a new or modified process to identify potential environmental releases, waste generation, hazardous chemical use, and potential impacts to the environment or worker safety. Results of this review are posted on the World Wide Web. Different Laboratory divisions access the information and provide feedback on permitting, notification and other documentation that may be necessary. DOE is able to review the project with regard to National Environmental Policy Act (NEPA) regulations to determine whether the project is significant and that may need an environmental assessment or an environmental impact statement.

ESA also uses the quarterly Appendix F self-assessment to track action plans. ESA compliance experts track noncompliance in waste management, air and water quality, as well as other areas. Data from this report are tracked and trended; remedial steps are defined. ESA meets regularly with DOE officials to discuss progress or issues in Appendix F requirements and receives feedback from DOE.

Employees are involved in every aspect of the planning process. ESA managers and employees together developed the ESA ISM plan. ESA division employees have served on various Laboratory committees to draft the overall Laboratory operating regulations called the Laboratory Implementation Requirements (LIRs). LIRs are linked to Appendix F and used to track requirements for environmental management.

In 2001, ESA division spent more than \$13 million to support Environment, Safety, and Health experts who conducted studies of ESA work practices ranging from ergonomics to explosives machining.

Another successful implementation of the planning process is the Generator Set-Aside Fund (GSAF). GSAF funds are administered by the Laboratory's Environmental Science and Waste Technology division. The funds are basically a tax on waste producers at the Laboratory and are specifically earmarked for pollution prevention and energy efficiency (P2E2) initiatives. The Laboratory uses nearly \$500,000 of these funds per year to purchase new equipment or services that are P2E2 compliant. ESA received \$125,000 for a metal chipper for the machining facilities that further reduced waste in the shops.

ESA is one of the most heavily regulated and intensely audited organizations in the DOE complex. Regarding the environment, safety, and health practices alone, ESA participates in more than 20 formal audits per year. An recent audit found exemplary practices in ESA. ESA's facility work control program was identified during a DOE audit as an excellent program that demonstrates the CQI process. DOE said that the process should be an example for other work control systems at the Laboratory.

Hazard Control Plans (HCP) are another method to address environmental protection in a written plan. Figure 2-4 indicates a typical table of contents for a HCP.

Finally, LANL has chartered an Environmental Protection Council, on which the leaders of ESH, E, and FWO Divisions sit. This body is the owner of the newly adopted Integrated Management Plan for Environmental Protection Programs, through which the Council exercises senior management oversight to promote implementation of LPR 404-00-00, Environmental Protection. LPR 404, the main ISM institutional-level driver for environmental requirements, cascades downward to numerous LIRs that govern ESA activities. See Figure 0-2 for graphical representation of ISM components. See Figure 2-5 for a process map depicting the functions of the Integrated Management Plan for Environmental Protection.

Hazard Control Plan ESA-EPE: HCP:01-3, 1 December 2000	
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Figure 2-4. Example of an HCP table of contents

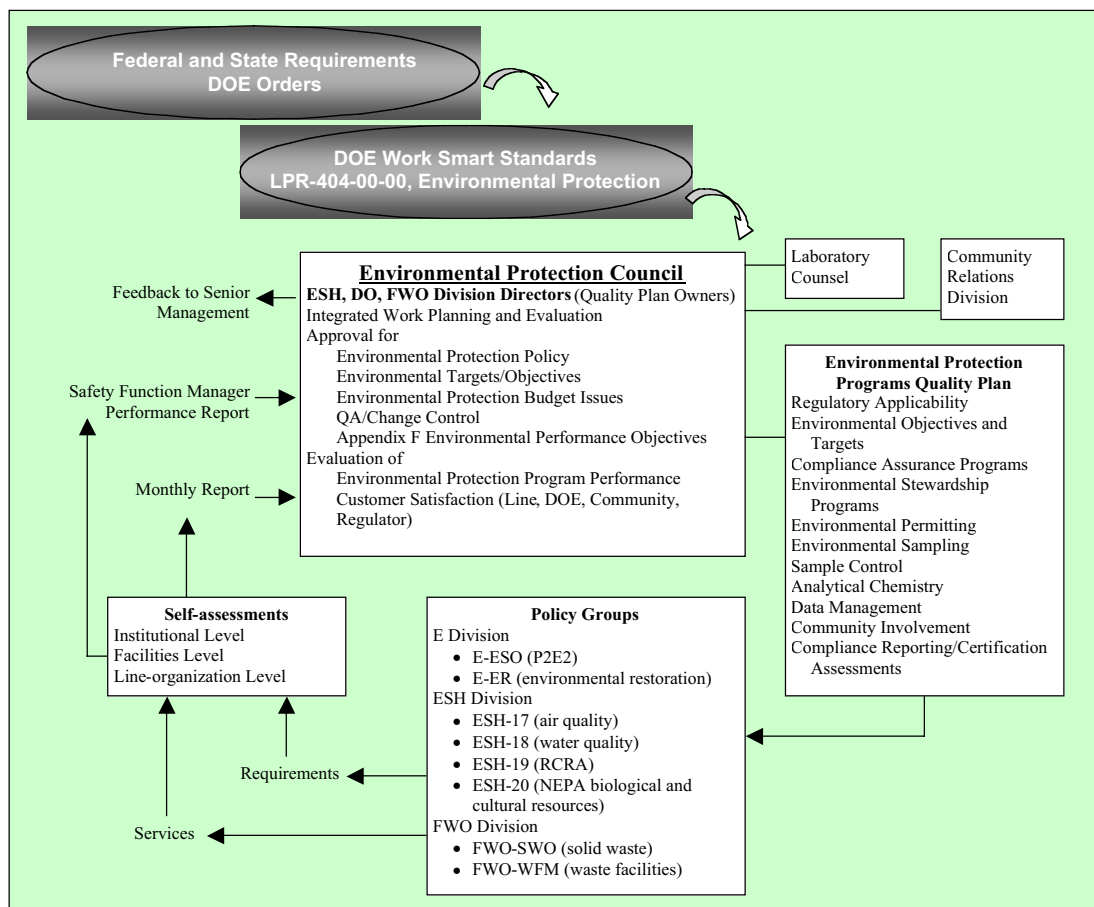


Figure 2-5. Integrated Management Plan for Environmental Protection Programs is owned by an interdivisional council

3 CUSTOMER, SUPPLIER, AND OTHERS INVOLVEMENT

3.1 CUSTOMER INVOLVEMENT

Just as frequent and open communication marks ESA Division's internal management practices, so does it characterize interactions with customers and stakeholders. The division is highly conscious of the need to fully involve all affected parties in seeking to improve the efficiency of work and to demonstrate a sustainability ethic in daily operations. The key process for involving customers is embodied in the performance measures found in Appendix F of UC's operating contract, which accomplish this objective by providing clear expectations, promoting accountability, and improving customer relations. Hence, Appendix F serves as a major vehicle for both determining customer requirements and performance levels for all of ESA Division's customer segments. Table 3-1 shows a number of Appendix F criteria especially relevant to customer involvement.

Table 3-1. Appendix F Measures Relating to Customer Satisfaction

Operations and Administration Functional Area	Performance Measure	Focus
Financial Management	2.2.b	Effective reporting to customers
	3.1.a	Customer satisfaction
Human Resources	1.6.a	Customer feedback in workforce planning
Information Management	1.2.a	Customer focus in network services
Procurement	1.1.a	Assessing system operations
	1.2.a	Effectiveness; JIT Contracts
	1.3.a	Supplier performance
	1.4.a	Socioeconomic subcontracting
	2.1.a	Customer satisfaction rating
	3.1.a	Employee satisfaction rating
Property	5.1.a	Aligning customer expectations

DOE—our primary customer—drives the Laboratory toward greener practices and, by extension, drives ESA Division, as well. For example, in keeping with the DOE goal to realize a recycling rate of 45 percent for sanitary solid waste by 2005, complex-wide, ESA has aggressively pursued metal recycling at our shops and high explosives complex. In 2001, through a partnership with JCNMM and ACE metals, ESA recycled more than 10 tons of metal.

The explosives complex recycled another couple of tons of metal by recycling an incinerator for HE-contaminated trash. A key requirement in all construction projects is that a waste minimization plan be developed. In the Environmental Assessment for the new ESA Engineering Complex, ESA committed to partner with FWO-SWO to recycle non-contaminated asphalt, concrete, and other reusable materials at the LANL Material Recycle Facility.

In 2001, ESA personnel also were active in working on a wildfire mitigation project involving the thinning of trees. This project partnered with industry, laboratory employees, the public, and state and federal agencies to minimize wastes. Industry was involved in removing the sellable logs. Laboratory employees and the public were given free access to the smaller wood that was useful for firewood. The New Mexico Environmental Division partnered with the Laboratory to permit and install air curtain destructors to burn the residual that could not be salvaged. The use of air curtain destructors minimized air emissions by orders of magnitude over what they would have been if open burning had been used. The U.S. Forest Service is now considering this technology to minimize air emissions from forestry-related burning.

Beyond being greener, ESA has a premier fuel cell research facility. ESA's Fuel Cell Engineering team partners with industry and other governmental agencies to develop fuel cell systems for power generation for transportation and stationary applications. The overall goal is to reduce greenhouse gases by increasing energy conservation efficiency and to reduce pollutant emissions.

All of ESA Division's customer focus approaches are based on the model shown in Figure 3-1. Using the requirements and expectations data obtained by this model, the division can align its business plan with customer priorities. The model also helps the division take action to improve customer satisfaction and close the loop with the customer.

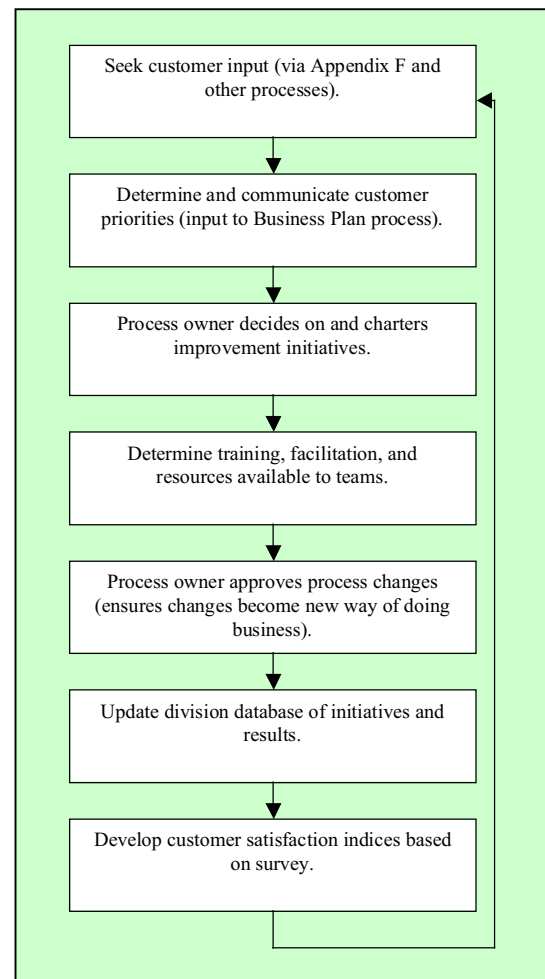


Figure 3-1. ESA Division's customer satisfaction model

Appendix F requires an annual self-assessment and evaluation by both UC and DOE. ESA Division senior leaders go beyond the requirement by meeting every other month to review ES&H status and perform a formal written self-assessment. ESA leaders prepare a quarterly Appendix F self-assessment to track current progress and provide feedback. In addition to frequent reports, there is regular interaction that prevents surprises, mitigates problems, and creates a working collaboration, rather than an adversarial relationship.

Another important way that ESA communicates with DOE, as well as with the public, is through the National Environmental Policy Act (NEPA) process. The NEPA process ensures that there are no adverse impacts on the environment and provides the opportunity for public input for projects that might have significant environmental impacts. At LANL, this process is triggered by the development of an ESH-ID, which may in turn trigger an EA or EIS. The Site-Wide EIS and the Environmental Assessment for the Engineering Complex have already been described in Category 2.3.

The ESA Web page is another tool that ESA uses to communicate with its primary customer. By using photographs and informative text, ESA division keeps DOE updated on program progress. ESA Division uses its Web site to communicate with customers, stakeholders, and suppliers, keeping all parties well informed of current and projected progress. The site contains extensive information, including program details and answers to frequently asked questions, while minimizing paper consumption. The Web site also allows users to send requests or comments to the immediate attention of ESA staff. The division's use of electronic communications also encourages customers to conserve resources.

To monitor public perception, ESA Division relies on an annual survey of public opinion, which LANL has conducted since 1998. The resulting reports profile New Mexico community leaders' awareness of and satisfaction with LANL operations. The survey also helps to identify current and emerging issues of importance to leaders in the region. In addition to asking about general perceptions of LANL, the survey allows respondents to voice their opinion of LANL's environmental responsibility. Results from the survey are recorded, analyzed, reviewed, and used in planning activities. As discussed in the overview, ESA Division is a government organization with a fixed market (LANL) and captive customers. Therefore, criteria that call for information regarding expanding markets, developing business opportunities, or potential customers are not applicable.

ESA conducts a yearly survey of their specific customers as part of their report to the division review committee. This report includes both Laboratory internal customers as well as external DoD and DOE customers.

3.2 SUPPLIER INVOLVEMENT

Most of ESA Division's opportunities to interact with vendors on the basis of environmental concerns are limited. In addition, LANL financial policies require that most product/service purchases be coordinated through LANL's BUS Division. Specific supplier requirements are defined for each supplier in a customized contract, which is negotiated, implemented, managed, and evaluated by BUS procurement personnel. When data suggest that a change to the supplier's process be made, BUS Division provides a team to work with the supplier to improve its process using the classic plan-do-check-act—aka PDCA—process. BUS Division is also responsible for evaluating the overall performance of suppliers, as specified in Appendix F. Figure 3-2 shows the LANL contracting process, which ESA Division follows.

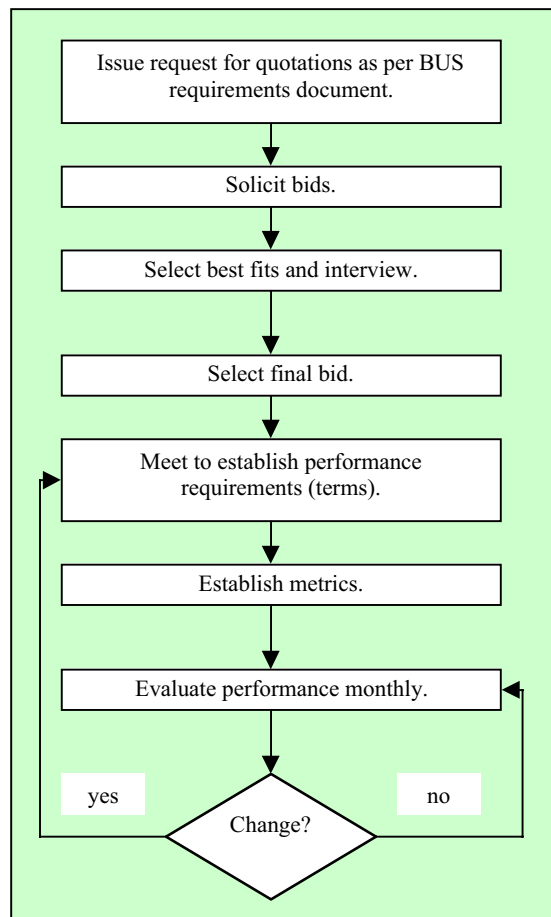


Figure 3-2. The supplier management process

Within its limited sphere of interaction with suppliers, ESA does, however, employ several environmental considerations. For example, the division now ensures that vendors supply only computers equipped with Energy Star, an energy saver function that turns off the monitor's screen when the computer is not in use. The division also is making a determined effort to ensure that purchased office products, including paper, contain recycled content.

ESA is voluntarily replacing all burned out fluorescent bulbs with “green” ones to eliminate the mercury-containing bulbs.

3.3 OTHERS INVOLVEMENT

Key stakeholders include Laboratory and division employees, the regulatory agencies, and surrounding communities.

In close cooperation with employees from the Environment, Safety, and Health Division, ESA supports preparing permit applications, providing technical input to regulatory agencies, and assisting in regulatory audits. ESH officials have developed a close working relationship with regulatory agencies to manage

compliance. ESA's water and hazardous waste groups meet regularly with the New Mexico Environmental Department to track project progress.

ESA experts also participate in the development of regulations, when the regulatory agencies allow or request such participation. When invited, ESA staff members participate in trust-and-partner activities to aid in developing regulations. For example, ESA employees participated on DOE's national beryllium standard and on NMED's air quality regulatory review program. When there is no invitation to participate, ESA officials provide comment on pertinent regulations and ESA employees participate in public forums and public hearings.

Written reports are also distributed for all audits. Regulatory audit results and other continuous environmental improvement project data are published in an annual LANL Environmental Surveillance Report. Routine monitoring data is also published in this report. The Environmental Surveillance Report is mailed to key stakeholders, members of the news media, interested parties, and other members of the public. The report also is sent to various reading rooms and public libraries.

ESA reports data about accidents and incidents in a systematic, graded manner. In the event of a spill or accident, any release levels that exceed regulatory limits are reported to ESH Division officials who, in turn, report the release to EPA and/or NMED.

ESA also supports the DOE lessons-learned-type program, called the Occurrence Reporting and Processing System (ORPS), at Los Alamos. The DOE complex-wide program shares information about accidents and incidents with other DOE facilities and provides information on how these accidents or incidents might have been prevented. If an event that adversely affects or has the potential to adversely affect the health, safety, security, environment, or operation of a facility, ESA officials immediately report it through this system. ESA and ESH officials analyze the situation and assign a root cause, assign responsibilities, and define remediation, if necessary. These activities are documented in the ORPS reports and are available to the public on the Web and in LANL reading rooms.

We also consider the evaluation to be provided by the Green Zia examiners as an opportunity to receive third-party, independent assessment of our continuous environmental improvement program and its results. Reports are prepared and distributed internally for all audits. Regulatory audit results and other continuous environmental improvement project data are published in LANL's annual Environmental Surveillance Report and distributed to the public and other interested parties.

4 INFORMATION AND ANALYSIS

4.1 INFORMATION COLLECTION MANAGEMENT

The Appendix F process and ESA's quarterly self-assessment process are key performance indicators of LANL contractual requirements with respect to information collection and management. See Table 4-1 for a listing of applicable Appendix F and ESA's performance measures.

Table 4-1. Appendix F Measures In the Information Management Focus Area

1.1 ISM's Process Improvement Measures	
Performance Indicator	N/A
Maintenance of Authorization Basis	Yes
Fire Hazard Analysis	N/A
Conduct of Operations	N/A
Chemical Management	N/A
Occurrence Reporting and Processing of Operations Information	Yes
1.2 ISM's Effectiveness Measures	
Environmental Performance	Yes
Radiation Protection of the Worker	N/A
Routine Waste Minimization and TRU Waste Minimization	N/A
Injury Illness Prevention	Yes
Non Appendix F	
ORPS Report	Yes
Integrated Mission/Programmatic Expectations	Yes
Strategic Hiring Expectations	N/A
Financial Management	Yes
Conduct of Operations	Yes
Facility Consolidation & Modernization Expectations	Yes
Project Management Expectations	Yes

Appendix F of the University of California contract is the key performance indicator of ESA's contractual requirements and a measure of customer satisfaction. Managers monitor progress related to project and performance goals. Managers use that information to develop and modify operational plans and identify areas for improvement.

Additional methods for obtaining data result from data mentioned in Section 2, the Site-Wide Environmental Impact Statement, the ESH-ID process, and the five-step action planning process.

ESA also collects information from the following Laboratory tools:

- Occurrence Reporting and Processing System (ORPS) and the Lessons Learned program,
- Management Walk-arounds,
- Automated Chemical Inventory System database,
- Annual employee checkpoint survey,
- Annual upward appraisal,
- Annual public opinion survey,

- Safety Concern Program,
- Nested Safety Committee reports,
- Internal and external audits and assessments,
- Regulatory requirements, and
- DOE orders.

Appendix F is also a primary mechanism that LANL uses to document organization-wide environmental activities, especially by means of division-level Quarterly Appendix F Self-assessments. Self-assessment input includes data on waste disposal, radiation exposures, internal laboratory audits, external audits by organizations like NMED, DOE-wide occurrence reports, internal Laboratory occurrences and lessons-learned reports, ISM walkaround findings, regulatory requirements, and DOE orders.

ESH has a culled body of leading ES&H indicators from ISO 14000 standards and from the best-in-class practices of private-sector companies, e.g., Johnson & Johnson, DuPont, IBM. Leading indicators tracked include such key yardsticks as chemical purchases, ergonomics statistics, and preventative maintenance records for radiological facilities.

ESA uses the Laboratory's ESH-ID process as a method to obtain ESH input to projects. ESH-ID information is accessible on the web, where it is consulted by ESA and other Laboratory organizations, which provide feedback. Permits, notification, and other documentation needed are identified at this stage. The Laboratory's P2E2 program as well as ESA's ES&H team review the ID for P2E2 opportunities. DOE reviews the project with regard to NEPA requirements to determine whether the work is significant enough to trigger an environmental assessment or environmental impact statement, to assure that there are no significant adverse impacts and that the project is environmentally sustainable.

The ISM ESH-ID process, then, constitutes a key environmental information management system at the Laboratory such as affirmative procurement percentages, internal RCRA audits, and regulatory violations.

Another key environmental management system is the ACIS (Automated Chemical Inventory System) database. ESA uses the automated database to ensure that our processes are kept at the lowest possible environmental risk. ESA partners both with ESH-5, the owners of ACIS, and the authorization basis groups in using this tool. ESA uses ACIS data to calculate the total amount of each flammable, toxic, or corrosive chemical, building by building. ESA compares the building totals to conservative screening levels provided by authorization basis groups to ensure that chemical would not adversely affect the health or safety of workers or the public. Special plans must be written for any buildings that would have enough chemicals to be hazardous. This analysis has enabled ESA to reduce building chemical inventories below levels of concern.

ESA partners with FWO-SWO and JCNNM to track waste generation and minimization information. Each shipment of waste is tracked through the use of recharge numbers. This provides ESA with feedback on our progress toward waste minimization goals. Pollution prevention data is also supplied by the Green Purchasing Report. P2E2 qualifies projects as "green" because they are reusable, recycled: containing post-consumer material or recovered material; recyclable: consisting of components that can be completely recycled; bio-based; bio-degradable; energy efficient; water or energy conserving; free of pollutants; and/or packaged with minimal materials. Purchases of these products are tracked by LANL's P2E2 program for each division. ESA uses this information to ensure we are meeting our procurement goals.

New processes or existing processes using new materials may require detailed examination using the NEPA screening tools or the ESH-ID process. A new HCP may be required if the process or material hazards have not already been examined and appropriate controls put in place. HCPs are reviewed and revised at least annually. ESA will soon begin revising all HCPs so as to include protection of the environment as a safety concern, even at the level of office operations. Modification of facilities always require ES&H reviews to identify potential hazards and controls.

Through the use of HCPs, management and employee commitment have directly impacted employee health and safety statistics. In the past five years, ESA has reduced OSHA Total Recordable and Lost workday injuries and illnesses to rate as “World Class.”

Finally, ESA tracks information gathered through participation in LANL institutional programs. For example, senior leaders review results from LANL's public opinion survey and also analyze division-specific information from the annual Employee Checkpoint Survey.

Life-cycle analysis affects all facets of planning at LANL. Specific LIRs and LPRs that address life-cycle planning include the LANL Comprehensive Site Planning Program, Construction Project Management Program, Project Management for the Acquisition of Capital Assets, Managing Facility Assets, Facility Configuration Management, and Managing Radioactive Waste. These documents require that projects analyze energy, waste disposal and reduction, environmental impacts from construction, and eventual facility decontamination and decommissioning life-cycle impacts.

Because LANL is not a production facility, true cost is not a factor that is tracked. Rather, Appendix F is used to determine whether the customer is satisfied with productivity, the cost, and the product.

ESO tracks ESA's (and all Laboratory division's) level of green procurement and a wide range of waste-generation metrics that include sanitary, hazardous, low-level, mixed low-level, and transuranic waste. ESO presents these statistics to ESA in quarterly reports at group leader meetings.

4.2 ANALYSIS AND DECISION-MAKING

Legally, the division is required to comply with all regulations and DOE orders. Prioritizing opportunities for improvement, then, is informed, first and foremost, by the findings of such audits (internal or external). Audit findings that are not disputed must be addressed by the responsible party. At the division level, such findings are prioritized based on a risk matrix that accounts for the protection of employees, the public and the environment. Corrective action is identified, approved, and tracked to completion via the Laboratory's I-Track system.

Planning tools take many forms at the Laboratory and ESA, including the Appendix F measures, Self-Assessment Plan, the Five-year Plan, facility safety plans (FSPs), and authorization basis (AB) documents. All of these tools are brought to bear in the effort to improve products and services. The NEPA screening process, including ESH-ID is not only a powerful information collection and management system but an effective planning tool as well, especially for identifying regulatory compliance and pursuing opportunities for P2E2, cost savings, and risk reduction. The result is a comprehensive effort to improve ESH both at the division level and at the Laboratory as a whole.

To the extent that Appendix F reporting compares environmental and safety performance against specific prevention-based environmental performance goals across the entire DOE complex, LANL uses this mechanism to gauge its achievements against its fellow laboratories—our primary competitors for

DOE funding. The various measures and ESA performance are described in Categories 5 and 7. The ways that the Appendix F requirements for green trends are incorporated into project/product design have already been described throughout previous chapters of this application. Item 2.1 describes how Appendix F measures are used to set strategic direction for environmental improvement.

5 EMPLOYEE INVOLVEMENT

5.1 EMPLOYEE EDUCATION AND SKILL DEVELOPMENT

A major goal in ESA is for each employee to understand his or her role in achieving division success. Working with the individual employee, ESA managers are responsible for preparing Individual Performance Objectives (IPOs)—goals and objectives that the employee will be accountable for. Included in the IPOs is a development section in which the employee states what training they need or desire to obtain these goals.

The IPOs are based on a set of objectives that the management team has developed and the employee determines how he or she can support these goals on an individual level. Environmental and safety objectives are part of this process. This ensures that the employee understands the organization's goals and objectives. It is up to the individual to apply these goals and objectives to his or her own job. After the employee drafts up objectives, the manager and the employee meet, ensuring two-way communication and buy-in for the individual's performance plan.

Overall, employee-management relations at LANL are governed by the Performance Management System, launched by Human Resources Division (HR) in 1998 (see Figure 5-1). The system requires all groups in ESA Division to establish objectives that support the organizational echelons above them. Objectives for each employee are then designed to ensure that the organizational objectives are met and that the employee has a clear view of how his or her work requirements contribute to the success of the entire organization. The Performance Management System ensures clear two-way communication during the goal-setting phase of the process and provides a focus for ongoing discussion about work objectives and processes. Specific goals include the following:

- Aligning individual expected results with institutional goals,
- Identifying and assessing individual performance,
- Linking performance to rewards or consequences,
- Designing development plans to support improving performance in current jobs and/or increasing impact on the organization,
- Enhancing employee/manager ownership of individual and organizational performance, and
- Improving two-way communication between supervisors and employees.

Another process that defines what training is needed is the Laboratory Implementation Requirement (LIR) on Laboratory Training. Employees fill out a questionnaire regarding the types of work they conduct. Supervisors identify general training needs by the type of work done by the employee. General training needs are identified by how these questions are answered (e.g., workers who use chemicals are required to take specific chemical safety and waste generator training). Division managers work with each employee to cooperatively prepare individual development programs—both short-term

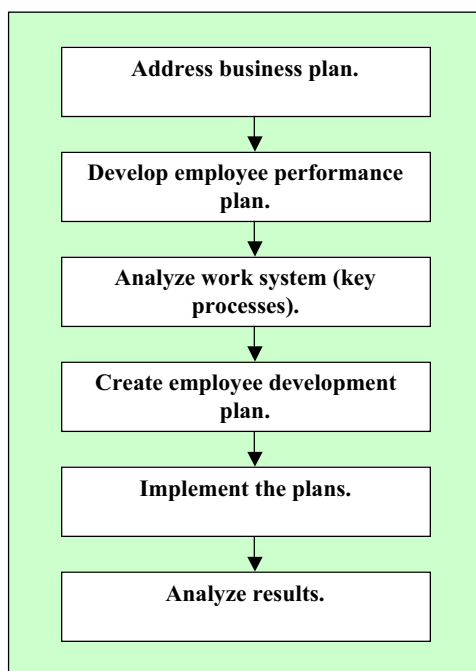


Figure 5-1. LANL's Performance Management System

and long-term—on an annual basis. It is the manager's responsibility to supply the resources (time, money, and support) to enable the employee to accomplish his or her development plan.

Specific ES&H training requirements are identified in each LIR. Employees must complete the specific tasks in the training document. For example, there is specific training for chemical worker or waste generators such as the Hazard Communication Training.

Once developmental goals have been established, employees may participate in appropriate training offered by LANL or other organizations. LANL's ESH Division offers over 40 courses related to environmental issues, from general safety training and first aid to courses on such specific topics as packaging and transporting hazardous materials (see Figure 5-2).

LANL and ESA Division training is assessed by audits. Also, each worker receiving training evaluates the course. ESH Division modifies training in accordance with audit results and worker evaluations. In addition, they develop training for new regulatory requirements and receive feedback from the support and operating groups on the content of the training.

To keep division employees abreast of salient environmental compliance issues, ESA identifies areas where the Laboratory offerings are insufficient. For example, ESA paid for a refresher course for hazardous waste generators to improve RCRA compliance and required all of our generators to take the course. ESA developed internal training for chemical management to improve worker awareness of OSHA requirements. Also, each supervisor works with employees to determine specific training needs and arranges for off-site training, as needed. ESA staff attended training for RCRA compliance, ergonomics, industrial hygiene, fire protection code, health physics, and radioactive waste.



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> Packaging and Transportation
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[Driving](#)
[Specific Hazards](#)

> Radiation
[Criticality](#)
[Emergencies](#)
[General Worker](#)
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[Radiological Worker](#)
[Specific Hazards](#)

> Safety
[Cranes](#)
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Figure 5-2. The ESH Division environmental training home page

In addition, ESA sends out “heads up” emails to targeted groups of employees that include important information. The ESA bulletin includes pertinent safety and environmental information and the division maintains a Web page to keep information up to date.

All employees are trained on the five-step ISM process, and their supervisors are trained in the development of HCPs. The workers and supervisors together prepare HCPs to ensure that all potential hazards are identified and mitigated. Figure 2-4 shows a table of contents for one ESA Division HCP; note that training is specifically addressed in the document. The management level of approval of the HCP is based on the level of risk in the operation. If the level of risk is high, the level of approval is high. The worker’s supervisor assesses the worker’s job skills and training. If these are adequate, the worker is authorized to work under the HCP.

A key step in both the ISM and HCP-development processes is hazard identification and control, which includes environmental hazards. Personnel who use chemicals or generate waste receive specific training that covers all aspects of P2, from substitution to recycling. The training reinforces

the five-step process, which encourages creative thinking and novel approaches. This quality process has a feedback mechanism as the final step so that improvements recycle back into the system. New approaches and ideas are examined for compliance, safety, enhancing the existing process, and resource sensitivity. If these are met, the process can be modified and the new approaches implemented.

Continuous reinforcement of P2E2 practices, depending as it does on input from both managers and employees, promotes the environmental ethic throughout ESA Division, beyond mere compliance with regulations. In ESA Division, the added value of having ES&H professional on staff and on site helps managers and employees. These professionals have substantially improved ESA's P2E2 efforts.

LANL's highest-level goals (see the Six Zeros, Item 0.1) encourage employees, as good citizens, to promote the environmental ethic in their communities. One key process by which division employees actively address community issues is through coordinated volunteer efforts (Item 1.2), ranging from tutoring to foster care, with all-hands email notifications requesting support sent out frequently and volunteer fairs organized annually. Some of these activities, such as judging science fairs and student mentoring, focus on environmental activities. ESA staff participated in the following:

Outreach/Community: Volunteers and/or officers for:

- North Mesa Handicapped Riding Program,
- Relay for Life Cancer Walk,
- Santa Fe Cares/Aids Walk,
- Civitans civic organization,
- Blood drives,
- Girl Scouts, Boy Scouts, and Cub Scouts of America,
- Junior Olympic Women's Volleyball, Amateur Hockey Association, Youth Soccer League,
- Los Alamos Amateur Radio Club,
- Cerro Grande Fire Restoration Activities,
- Kinderkick YMCA,
- Animal Shelter Program, and
- Youth Athletic League coaching.

Outreach/Schools: Volunteers and mentoring

- Expanding Your Horizons Volunteers for high school girls interested in science,
- Los Alamos Lunch Buddies,
- Pinon Pre-School,
- Invent an Alien Workshop/Spring Fling at McCurdy School,
- Science Fair Judge San Juan Elementary School,
- Pojoaque Valley School District Capital Improvement Advisory Committee,
- Expanding Your Horizons Steering Committee,
- UNM-LA. UNM-Autonomous Control Engineering (ACE) collaborative proposals, UNM-NASA PURSUE Program volunteer, New Mexico State University,

ESA Division Green Zia Application

- MIT Internship Program,
- Gem Program,
- High school, college, and post-doctoral employment programs and mentoring,
- Women in Non-traditional Jobs – presentations to schools,
- Industrial Advisory Board at NMSU,
- Special Projects at NM Tech,
- 2001 Career Exploration Day with the Diversity Office and Hispanic Scholarship Foundation,
- Encourages support of the 1st Annual Student Symposium 2001, and
- Support employees to participate as educators for local colleges and universities.

Inreach:

- Group Project Seminar Series
- Member of the Hispanic Diversity Working Group
- Career Development Task force sponsored by Women's Diversity Working Group
- ESA Division-wide Annual Picnic
- Christmas Gift Certificates for Cerro Grande Fire Survivors
- Minority as Deputy Group Leader
- Dynamic Workshop

5.2 EMPLOYEE INVOLVEMENT

Of the eight guiding principles of ISM, seven are mandated by DOE Acquisition Requirement 970.5204-2, and the eighth—a commitment to employee involvement—was adopted on the Laboratory's own initiative.

ESA employees are involved in the development of new P2E2 products and services. Almost all of the ESA's P2E2 projects have been suggested by operating staff. The Division's two waste coordinators provide input to the P2E2 process through quarterly meetings. ESA administrative staff participated in a P2E2 committee to generate suggestions on how P2E2 could better be communicated to the administrative personnel who have responsibility for ordering green products. ESA employees serve on the Nested Safety Committee's ad-hoc subcommittees to resolve issues such as PCB replacement.

ESA staff served both on the IRMP committee to integrate natural resources and the Laboratory's mission as well as serving on the E in ISM process to improve review of projects with potential for improving P2E2 performance. Another initiative important to employees that ESA supported was an intensive 5-day mediated session to identify better ways to protect worker health and safety. ESA provided a worker for the intensive session and several workers are participating in the follow-up ad-hoc committees.

To facilitate communications, all division managers observe an open-door policy. Employees may also provide comments and observations at group meetings. Scores posted during the current round of Quarterly Appendix F Self-assessments are published. Employees stay current on P2E2 initiatives by having waste coordinators attend P2E2 meetings, providing staff for input on P2E2 initiatives

(such as the E in ISM and administrative staff input), and by submitting significant projects to the P2E2 program for review through the ESH-ID process.

Division employees take advantage of institutional mechanisms to minimize waste. For example, when employees have supplies, equipment, and materials that are no longer needed, the property administrator assigned to ESA can ensure that it is re-used. Employees can also advertise unused equipment on the LANL electronic Swap Shop, where excess property is made available to the rest of LANL. Employees frequently request assistance from the waste coordinators and property managers in recycle/reuse of equipment. For instance, equipment from a shop being closed by ESA was donated to a Machinist training program in Española. ESA computer support staff makes excess computers available to schools or salvage. Nearly all ESA personnel are involved in the paper and cardboard recycling programs. Many offices have established aluminum can recycling stations and make the cans available to the Boy Scouts, Civitans, or other civic organizations.

Employees may discuss any P2E2 issue with the ESA facilities manager, the ES&H Team, and waste coordinators. ESO has also established an electronic mechanism for soliciting employee input on P2E2. Employees can send comments, observations, or questions to wastenot@lanl.gov. The message is routed to the environmental specialist best able to respond, the sender will be notified of any proposed action, and ESO will track the issue to resolution. The SCP (Item 1.1) serves a similar function with respect to safety issues.

Laboratory-wide, employee involvement in key P2E2 processes is an essential LANL business practice. These efforts have been discussed in previous categories. ESA has gone beyond common practices, however. ESA has developed their own checklist for use in facility work control to better identify projects for P2E2 review and has developed an SOP for all small construction requirements that require a determination very early in the project whether a project requires an ESH-ID.

As an ESA employee's knowledge related to environmental issues increase, the number of calls to the ESH professionals also increase. The calls include concerns such as small oil spills from vehicles to water leaks.

The annual Employee Checkpoint Survey and the Upward Appraisal Program provide mechanisms for employees to give anonymous input. The Upward Appraisal Program, in particular, sets specific expectations for managers to review feedback with subordinates and to develop action plans for improvement. Figure 5-3 shows the overall Upward Appraisal process.

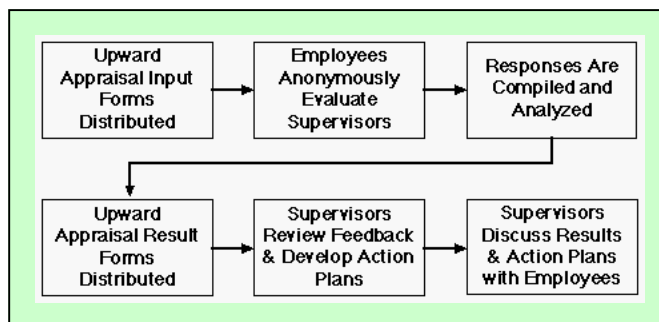


Figure 5-3. LANL's Upward Appraisal process

The Laboratory has issued the following official guidelines to managers for reviewing and using Upward Appraisal feedback from employees:

- Be non-defensive. If you are preparing your defense as you read appraisal results, you miss valuable information.
- Look for trends. The stronger the trend, the more important the information.
- Write an action plan. Written action plans are far more likely to be implemented than verbal directives.
- Keep your door open. Thank employees for their feedback and ask them to comment on your action plan.

Community involvement among employees has been discussed in Items 1.2 and 5.1. In some instances, outreach activities are part of ESA employees' regular duties.

5.3 EMPLOYEE SATISFACTION, VALUE, AND WELL-BEING

A key LANL business practice requires that employee interests be taken into account when planning activities, the workplaces in which they will be conducted, the risks they incur, and P2E2 issues.

The ESA ISM Plan requires managers to conduct monthly walk-arounds in their areas, looking for and correcting ergonomic concerns, work-area hazards, and environmental issues. ESA managers perform nearly 100 walk-arounds per quarter. Employees are encouraged to conduct walk-arounds too, which increases by 62 percent the total number of walk-arounds conducted at ESA. The ISM database tracks deficiencies that are identified during walk-arounds and assigns the responsible party for corrective actions and tracks the deficiencies until they are resolved. The database also compiles the deficiencies to identify and improve safety performance. Division employees may also enter and track their own safety issues through LANL's Web-based SCP (Item 1.1).

ESA Division's major formal method for determining UC prevailing employee attitudes in the workplace—including attitudes on ES&H issues—is the annual LANL Employee Checkpoint Survey, conducted by the HR Division Training and Development Group. The survey has been conducted every year since 1994, except for 2000, because of the Cerro Grande fire. Group leaders receive results from the survey specific to their groups. Managers are encouraged to share the results of the survey with employees. In 2001, HR distributed 7,300 forms, 47 percent of which were returned. The survey contained 48 questions about career development, communication, diversity, job satisfaction, management, pay, productivity, performance management, safety and security. Eighty-nine percent of respondents said their group management assures a safe work environment and use of safe work practices.

Other information from the survey includes the following results:

- 74 percent feel safe reporting potential security incidents that they are directly involved in.
- 81 percent are proud to be associated with the Laboratory.
- 77 percent said their work gives them a sense of personal accomplishment.
- 62 percent said group management communicates decisions to employees.
- 59 percent said there is an ongoing interest in their professional development in their group.

Overall, safety and security received the highest marks from respondents. Division leadership, recognizing the Checkpoint Survey as an effective tool in identifying opportunities for improvement, has increased employee involvement in ISM through the Nested Safety Committee.

There are institutional incentives encouraging staff to work smarter and utilize innovative approaches to accomplish their work. The Pollution Prevention Awards Program, sponsored by ESO, is open to all LANL employees and subcontractors. It is designed to encourage individuals and teams to develop plans, programs, or ideas for minimizing waste; conserving water, electricity or natural gas; reducing air or water pollution; or procuring products with recycled content. Recipients receive recognition and a cash award ranging up to \$125 from specially allocated congressional funds. Recent ESA winners include the following:

- The reconfiguring of the High Explosive Wastewater Treatment Facility (HEWTF) from batch operations to continuous re-circulation of wastewater reduced the need to change the activated carbon as frequently. Use of a treatment/reclamation facility also helps reduce the amount of waste generated by approximately 8,000 pounds per year (2000).
- The single largest generator of machine coolant waste has been the Laboratory's main machine shop. In FY98 the shop implemented a zero-waste strategy, and waste generation dropped from 14,000 kilograms annually to 4,000 kilograms. In FY99 the shop installed an evaporator to deal with the water that is the main constituent in spent coolant. The remaining oil is recycled, and the waste stream has now been nearly eliminated (2000).
- Employees in ESH and ESA division teamed together to implement a new and better way to detect uranium in recyclable metal chips (2001).

The Los Alamos Awards Program recognizes, by means of cash awards ranging up to \$2,000, achievements among UC employees not only in purely scientific and technical fields but also for notable accomplishments in the ES&H arena and for significant contributions to enhancing the quality of work life at the Laboratory. In 2001, the Los Alamos Awards Program cited the following Laboratory and ESA actions:

- An ecologist with ESH Division that tracks the status of commitments to NEPA,
- An ecologist with ESH Division that works with regional organic farmers in determining the effect of the Cerro Grande fire on their commercial produce,
- A team from ESA Division hosted a summer educational program for promising engineering students.

In addition, a member of the ESA-ESH Team won a Distinguished Achievement Award for her collaboration with Nonproliferation and International Security Division in biotechnological research.

In 2001, the ESA Division Office sponsored a get-together with all of the Green Zia participants to thank them for P2E2 efforts. Also, a group within ESA gave a monetary award to one of the waste coordinators (even though the coordinator was not in their group) who had contributed to their P2E2 efforts.

To provide emotional support, LANL provides an Employee Assistance Program whose main goal is to assist employees with personal problems that are affecting their job performance. The program offers a wide variety of presentations and workshops on such topics as stress management, gender issues, conflict resolution, and smoking cessation. The program also makes available a collection of books, videos, and

audiotapes on workplace issues. All services are free of charge. Usually employees refer themselves; however, a supervisor can refer an employee if job performance has been identified as a problem.

As part of the larger LANL community, ESA relies primarily on institutional programs to enhance employee support. LANL offers a comprehensive set of support initiatives along with feedback systems. Division employees are encouraged to use all LANL services that are appropriate and relevant to their individual needs, including the following:

- The LANL Wellness Center, to provide comprehensive fitness and life-style services, with small satellite centers. ESA has one of these centers, as well as a once-a-week fitness class,
- Alternative work-week schedules, to accommodate diverse personal needs,
- Formal and informal grievance procedures, to address discrimination, harassment, and interpersonal-skills issues, and
- An Ombuds Office and Mediation Center, to provide structured approaches in conflict resolution.

ESA is dedicated to improving the working environment of its employees. Most of our operational buildings are 50 years old or more, are in need of repair, and have antiquated equipment. Also, many personnel who must work closely together are often separated by many miles, and many employees are housed in temporary transportables. To remedy these problems, ESA has proposed consolidating functions in Engineering Campus. New facilities would be built at TA-16 for the shops currently located at TA-3, the testing operations located at TA-11, and a crafts support building for craft support staff located throughout ESA. Office buildings would be built to replace transportables and interdisciplinary teams would be located in close proximity. An Environmental Assessment has been prepared for this project and is awaiting DOE approval.

6 PROCESS MANAGEMENT

6.1 PROCESS CHARACTERIZATION AND CONTROL

Both DOE and UC stakeholders are active participants in establishing performance expectations and in appraising operational achievement through the Appendix F metrics and approval of AB documents. ESA Division has a contractual mandate to continuously monitor and analyze its processes for potential improvements.

As discussed in Category 2, ESA Division uses the five-step ISM process in strategic and action planning to identify environmental issues. P2E2 issues are resolved early in the planning process. The ESA ESH and Project Management teams are members of all large construction projects. These teams have developed procedures for ensuring that ESH-IDs are written early in the planning stages of the project and submitted for Laboratory and DOE ESH review. LANL's P2E2 program is one of the reviewers of all ESH-IDs. These issues, and their resolution, become part of daily operations through the HCP process, which govern work at ESA and the Laboratory. ESA managers use the wide variety of data, including data from customers, employees, and operational reviews, to assess the performance of key processes. Representatives of funding organizations are involved in process evaluations through their input into the quality and usability of the final product or service. All partners in the project provide operational evaluations through the development and revision of HCPs.

This process is designed to

- Involve the personnel at the location where the work is to be done (Steps 2, 3, 7, 12),
- Ensure that ES&H concerns are addressed (Steps 4, 6, 11),
- Provide quality assurance checks that the work is done properly (Steps 5, 8, 9, 14, 15), and
- Provide feedback to improve the process (Steps 14 and 15, feeding into Step 1).

Partners also provide operational evaluations through the ISM safe work practices. The ESA Division SWP process is designed to implement LIR 300-00-01. The SWP system enhances the efficiency of ISM. When subject to process analysis by means of quality improvement efforts, the success or failure of the SWP systems in managing environmental hazards is readily evaluated.

Figure 6-1 shows that opportunities for improvement occur in nearly every step with the final improvement steps in the QA that is performed at the end of the task. In the ESA self-assessment and in audits and assessments, management receives information on the status of their programs. Managers in turn identify process improvements that can then be implemented.

The success of identifying possible hazards and controls is evidenced increased safety and compliance at the Laboratory. For instance, there has been a marked decrease in lost work days. ESA has not had a lost work day in more than 400 days. LANL goes one step further and identifies failure that occurs despite ISM formally through the 5003.b process. This process identifies the root cause as well as changes that need to occur to prevent the failure in the future. These “lessons learned” are distributed to staff and managers to increase awareness and prevent future problems. ESA also puts out a twice-a-year bulletin that highlights successes and failures.

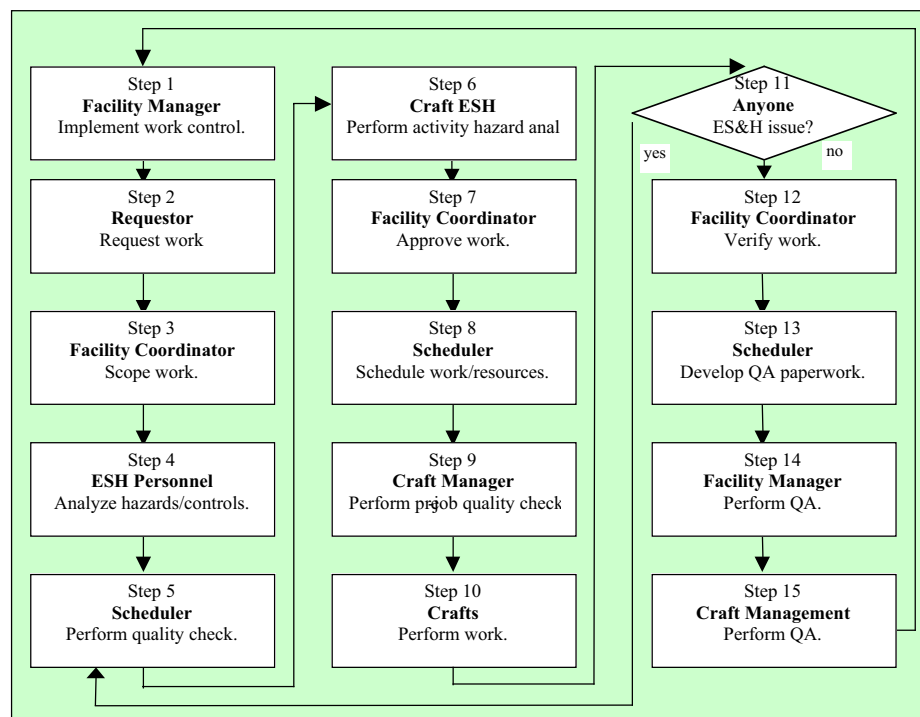


Figure 6-1. The ESA facility work control process

6.2 PROCESS IMPROVEMENT

As Item 6.1 explains, ESA Division has a contractual mandate to continuously monitor and analyze processes for potential improvements. The use of Appendix F metrics by our primary customer, the DOE, for process analysis and continuous improvement is a mature, eight-year-old system that has yielded significant upgrades in the way LANL does business. Category 2 describes how action planning and strategic planning integrate Appendix metrics with ISM (especially by means of HCPs and ESH-IDs) to prioritize areas for continuous improvement, both Laboratory-wide and in ESA operations, as well. Item 6.1 describes how Appendix F metrics are brought to bear on both the ISM FWC and SWP systems, with a view to continuous environmental improvement.

The ISM mechanism requires each division, including ESA Division, to assess its ES&H performance. ISM Self-assessment findings are institutionally reviewed by the high-level management LANL FIB, which sets Laboratory-wide improvement priorities and targets and annually develops an Appendix F Self-assessment Plan. At the division level, management becomes responsible for providing necessary resources to meet improvement the Board's targets and for monitoring progress. Figure 6-2 summarizes this process. Monitoring is accomplished quarterly in self-assessments.

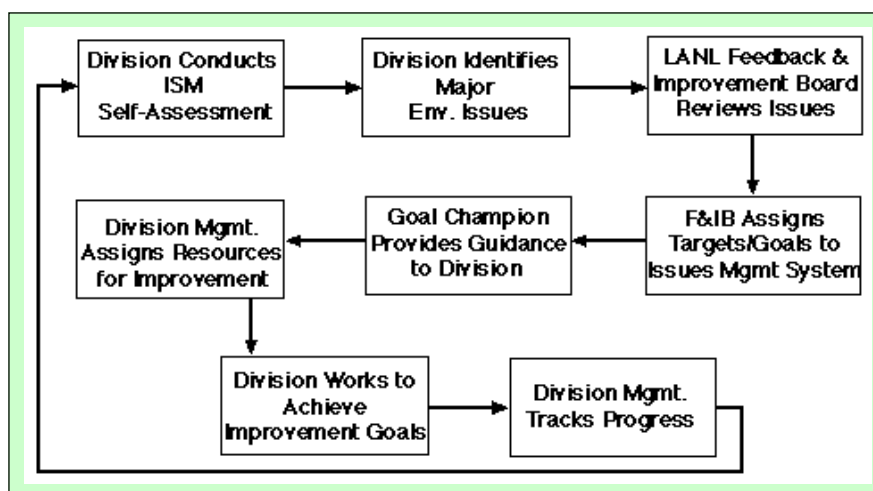


Figure 6-2. ESA Division's improvement process based on Annual ISM Self-assessments

At the division level, we establish our P2E2 priorities by reviewing Feedback and Improvement guidelines, Quarterly Appendix F Self-assessments, Annual ISM Self-assessments, walk-around feedback, and conducting monthly surveillance of all waste disposal areas.

Once priorities are established, action plans are developed in accordance with the principles outlined in Category 2 such that environmental improvement is integrated into daily operations, as described in Item 6.1.

While the FIB keeps ESA informed of corporate expectations for improvement, we consider their guidelines as minimum standards that we strive to exceed. ESA has gone beyond what is required. For example, ESA has eliminated PCBs and introduced “green” light bulbs to replace the mercury-laden light bulbs.

Division management well understand that benchmarking against counterparts such as LLNL is a potentially productive exercise if we are to achieve environmental excellence in our class. The mechanism for benchmarking is Appendix F (see Item 0.4). ESA uses the self-assessments to benchmark against the other divisions in the Laboratory and, where possible, against top corporations like Dow and DuPont, such is the case with injury and illness reports.

Results from improvement efforts and compliance successes are communicated to senior leaders at management sessions and as part of the quarterly self-assessments. Appendix F assessments permit benchmarking against other UC-managed Laboratories. Employees learn about process improvements at the all-hands meetings and through information published electronically or as memos.

Recognizing that the continuous drive to improve our performance at ESA will achieve little unless we assure organizational learning, we manage information in ways that reinforce the P2E2 ethic. Information on our successes, including awards (see Item 1.2), is communicated to division personnel at group meetings, emails, the division bulletin, and ESA all-hands meetings. Successes are publicized throughout the Laboratory, mainly by articles in the online daily NewsBulletin (<http://www.lanl.gov/newsbulletin>) and also the ESA bulletin.

Both lessons learned and successes within ESA are shared through notifications from the division and group management and from the ESA ESH team, primarily in emails and group meetings.

A significant example was the recent success of 365 days without a lost workday accident. The division held a celebration that included providing employees with customized ESA-logo shirts, and a letter from the division leader. The success was published in the DOE bulletin.

DOE learns of results through formal institutional lines of communication, and other stakeholders (vendors, the community) are informed through BUS contacts or by means of public affairs initiatives. Annual publications also provide stakeholders with yearly updates on environmental performance. *For the Seventh Generation: Environment, Safety, and Health at Los Alamos National Laboratory* is an annual report prepared especially for residents of communities surrounding LANL. The *Site-Wide Environmental Impact Statement Yearbook* is another publication that evaluates LANL environmental performance and tracks progress toward established goals.

ESA is quick to acknowledge failure, when appropriate. Management adopts a no-fault approach to communicating information about our P2E2 shortcomings, which we characterize as “opportunities for improvement.”

Like our process analysis system (Item 6.1), our process improvement systems are themselves subject to scrutiny. In this connection, see especially Figure 6-1, Steps 14 and 15.

As stated above, ESA Division has a contractual mandate to continuously monitor and analyze our systems for potential P2E2 improvements. Further, we have a strong financial incentive to do so. The cost of permitting, handling, and disposing of waste is a significant fraction of our operating cost. All told, a solid track record of P2E2 achievement implies that our process improvement systems are producing the desired outcome, as evidenced by the results (detailed in Category 0).

7 RESULTS

7.1 ENVIRONMENTAL RESULTS

ESA's commitment to waste reduction and natural resource conservation is very evident. One of the most successful resource conservation efforts has been in the reduction of water and of energy.

Water conservation: In order to make operations safer, water historically has been used in the processing of high explosives (HE). Machinists and researchers have used millions of gallons of water each year in processing HE. Before 1998, the HE-contaminated wastewater was discharged to the environment. But in the 1990s, ESA developed and implemented the HE Wastewater Treatment Project, which was completed in 1998. ESA reduced the annual water usage from about 12 million gallons in the HE production complex to only about 130,000 gallons—a reduction of 99 percent. The number of permitted HE outfalls, outlets where wastewater is discharged, dropped from 21 to 2. The trend of using less water will continue for the foreseeable future. Because of the efficiency of the treatment and the reduction of water usage, only about 0.2 percent of the original organic pollutants are discharged to the environment. This project received the 1997 Silver Award from DOE for outstanding customer service. In the spirit of continuous improvement, ESA employees independently developed a more efficient way of operating this facility that has resulted in even greater removal. In 2000, the employees received an ESO P2 award for their innovations. ESA is now exploring reusing the treated HE wastewater in on-site operations to further conserve water.

Energy conservation: Energy conservation is practiced at several different ESA sites. One of the most successful projects reduced the use of natural gas from 300 million cubic feet to only 200,000 cubic feet per year. ESA partnered with DOE and Johnson Controls of Northern New Mexico to replace an aging and oversized steam plant boiler with smaller, more efficient boilers. The new boilers also burn cleaner and have fewer air emissions.

On a smaller scale, ESA encourages personnel to install sensors that deactivate lights when no movement is detected in a room or to turn off lights in rooms that are not being used. Personnel are also encouraged to put their computers in the "sleep" mode when not in use.

On a much larger scale, ESA is redesigning our Weapons Engineering Complex. The complex was built during the Cold War and provided for large-scale high-explosives operations. Much of the space is now oversized, outmoded, and energy inefficient. ESA will consolidate operations by remodeling some buildings and building others. The new complex will be about 300,000 square feet smaller than the old complex, resulting in considerable energy savings.

Materials Reduction: ESA has implemented a very successful coolant reduction project in the machine shops. Biocide coolant—a coolant hazardous to the environment and potentially hazardous to workers—was used to machine parts. Once the container was open, the coolant quickly developed a bacterial coating that rendered it unusable. As often as once a week, technicians had to dispose of it.

In 1995, ESA took another look at using a greener product and moving beyond mere compliance. We replaced the potentially harmful chemicals with a 98 percent water-based coolant that contained a 2 percent rust inhibitor and no biocide. By circulating the coolant in a sump, we eliminated the growth of bacteria and extended the life of the chemical. The useful shelf life of the coolant was extended to more than a year. Waste was reduced by 97 percent, from 14,000 kilograms per year to only 400 kilograms

per year. Annual disposal rates declined from \$102,000 per year to only \$3,000. ESA is providing coolant reduction services to other Laboratory shops.

Again in the spirit of continuous improvement, employees soon realized that we could achieve more. By investing in an evaporator that removes the water from the used discarded coolant, researchers totally eliminated the waste stream. The evaporator transformed the waste stream into a zero-discharge, closed-loop system, annually yielding 2,000 gallons of reusable oil that can be transferred to a recycling facility. The chemical waste stream, therefore, has been transformed into a resource and the end result is zero coolant waste. ESA is now treating coolant from other shops at LANL to further reduce wastes.

This project received GSAF funding and the people who developed and implemented it received P2 awards from ESO.

Another successful materials reduction project that also received partial GSAF funding was the substitution of propane for wood as the fuel to burn HE-contaminated materials. When ESA used wood to burn the contaminated materials, the wood, not the materials, produced most of the ash. When the division switched to propane, the ash was reduced by about three tons per year. Because the waste was formerly HE-contaminated, the ash had to be disposed of as New Mexico special waste, even though it was tested and determined to be non-hazardous. The elimination of ash has assisted the institution to achieve 80 percent reduction of hazardous waste.

Another benefit of this project is that HE-metals could be recycled. The propane burns much more evenly than wood. Therefore, the HE can be certified as completely destroyed by ensuring the heat reaches a specific temperature. This process allows ESA to recycle metals that previously had to be disposed of in the TA-54 landfill. ESA was able to recycle more than 10,000 pounds last year.

ESA is currently planning a major five-year project to replace our existing outmoded facilities with modern ones. When implemented, space used to support ESA operations will be reduced by about 300,000 square feet, with a savings of approximately \$80 million in facility costs, part of which include energy, water, and other utilities.

ESA contributes to the institutional goals for waste reduction. LANL has committed via Appendix F to reduce hazardous wastes by 80 percent by the year 2005, using 1993 as a baseline.

Other recycling efforts at ESA include the following results:

- Recycling of oil began in 1998. ESA recycled approximately 20,000 pounds or 1,300 gallons,
- Recycling of cardboard began in 1998. ESA has increased the number of cardboard recycling dumpsters from 8 to 12,
- Recycling of more than 10 tons of metal Laboratory-wide not including construction waste. ESA recycled about 4 tons in 2001,
- Recycling of nearly 2,040 pounds of batteries in 2000. ESA recycled approximately 1,500 pounds in 2001,
- Closing of the high explosive incinerator by reducing contaminated combustibles by nearly one ton per year beginning in 1996 through implementation of a process of more rigorous segregation of high-explosive contaminated waste,
- Identifying of an offsite treatment facility to receive ESA granulated activated carbon for recovery and reuse reducing waste by more than 20,000 pounds,

- Replacing mercury-containing fluorescent light bulbs with non-mercury light bulbs, thus reducing hazardous waste by approximately 5000 bulbs/yr in future years. Laboratory –wide, LANL replaced nearly 922 pounds or almost one metric ton were recycled in FY01 for mercury recovery,
- Obtaining DOE funds, with the help of the LANL P2E2 office, to separate storm water and industrial water at the TA-11 drop pad to improve treatment of the industrial water, thus eliminating an HE outfall,
- Recycling approximately 3 tons of lead no longer needed for ESA operations,
- Retiring 29 PCBs capacitors at a cost of approximately \$80,000,
- Changing high explosives (HE) treatment methods so that the metal could be recycled rather than landfilled as a New Mexico special waste, approximately 10,000 pounds of metal in 2001,
- Reducing ash (a New Mexico Special Waste) from the TA-16 Burn Ground by replacing wood with propane as the fuel for flashing HE-contaminated materials,
- Recycling of lead solder from electronics operations,
- Replacing a below-ground gasoline storage tank with an above-ground tank and exploring the use of alternative fuels such as ethanol for ESA vehicles,
- Installing oil collectors for air compressor blowdown,
- Identifying sources of cooling water that can be eliminated to reduce the number of outfalls and seeking funding for those projects,
- Converting from chemical film development to digital radiography at the HE complex, and
- Developing a plan to consolidate engineering activities to reduce space needs by about 300,000 square feet, with resultant energy savings.

As a research facility, LANL has a constantly changing set of processes and products. Therefore, the production concepts of efficiency and productivity, generally applied to a single product, are not particularly applicable. Instead, Appendix F is the method we use to set environmental improvement goals and measures. The Appendix F measures have been discussed in previous chapters.

Appendix F is also a method ESA uses to track current levels and trends of environmental safety and health.

7.2 CUSTOMER, SUPPLIER, EMPLOYEE AND OTHER RESULTS

ESA employees have been actively involved in innovative ideas to make our pollution and energy reduction more effective. Several examples were given in Section 7.1, in which a process was implemented and employees improved upon.

Another employee involvement example is in the machine shop waste reduction area. In the early 1990s, the ESA-Weapon Materials and Manufacturing (WMM) Group machine shop produced numerous waste streams ranging from scrap paper to radioactive scrap metal and hazardous industrial chemicals. Employees implemented a low-cost change in process to address the large volume of product and yet reduce waste from potentially radioactive waste streams. The employees segregated all machining equipment and tooling, separating the radioactive work from the non-radioactive work.

Employees developed more ideas by segregating material waste so items would not automatically be designated as contaminated waste. To address the specific problem of contaminated materials, all potentially radioactive scrap was segregated for further monitoring. Now, due to custodian initiative, even floor sweepings are segregated and surveyed for radioactivity and kept out of the waste stream when possible.

ESA has worked with a manufacturer of a metal chipper that will benefit the rest of the country. The WMM Machine Shop generates more than 680 kilograms of machine metal scrap annually. These metal shavings are all assumed to be potentially contaminated, even though only a minute fraction is actually radioactive and only at very low levels. The manual method of separating the scrap metals was not satisfactory because the scraps tend to ball up and the results were only 40 percent successful.

In 2000, ESA purchased a commercially available metal chipper and conveyor system modified with a radiological monitoring system that would automatically detect radioactivity. The machinery automatically monitors the chips. When contamination is identified, a hand-held monitor is used to segregate the contaminated chip. With the chipper, the radioactive waste is separated, resulting in a volume reduction of 95 percent. The large residual of clean metal, more than 630 kilograms, can be recycled. This resulted in an annual disposal savings of more than \$27,000. The manufacturer of the device, the Ludlum Company, has decided to add the monitor to their product line, making this new radiological monitoring tool available to the entire nuclear industry. These types of projects have assisted LANL in meeting the E2 and utilities conservation measures of Appendix F. Using methods for continuous improvement for strategic and action planning described in Chapter 2, ESA performs P2E2 analyses to determine energy efficiency improvements, material usage reductions, and water, waste and air emission reductions.

ESA workers also provide input to Laboratory P2E2 processes. For example, as part of a Laboratory-wide team to implement LPR 404, a member of ESA's ESH team was instrumental in developing a checklist to identify environmental issues for facility work control projects. ESA now uses that checklist to trigger further environmental review of ESA-FM projects.

For ESA's major customer, DOE, we use the Appendix F process as a way to identify customer requirements and to gather feedback regarding customer perception of division performance. ESA also received an "excellent" rating on the Science and Technology section of Appendix F in 2000 and improved to "outstanding" in 2001.

In addition to the employees and suppliers, the public and regulatory agencies are other ESA customers with a stake in our performance. Public involvement has been discussed extensively in previous chapters. Information after 1998 is not available because the nature of the questionnaire, done by the Laboratory's Community Relations Office, changed. In the new survey, environmental performance is not addressed. Instead, open-ended questions allow respondents to raise topics of concern. The Laboratory's extensive supplier and vendor programs, along with the community involvement aspect, have been described in Categories 0 and 1.

7.3 FINANCIAL RESULTS

ESA provides considerable support to the institutional efforts previously discussed in Category 0. These institutional investments are more than \$13 million per year. ESA also invests considerable time and money in implementing the five-step ISM process. However, there is no way to directly measure this investment.

While ESA has significantly reduced waste, the costs of supporting the institution's programs generally do not decrease, because ESA supports an institutional infrastructure that decreases in size very slowly. Recycling and other methods of waste reduction are often more expensive in the short run than the actual disposal of waste. Figures used in a recent study to identify options for the Los Alamos County Landfill indicated that recycling costs more than twice as much as landfill disposal. Clearly, the Laboratory is committed to investing in the future rather than reducing costs.

Rather than trying to estimate general trends that may actually show an increase in costs, ESA has summarized the project specific cost savings from some of the activities mentioned earlier in this chapter. Some assumptions were made to estimate these costs. For example, cost-saving metal and cardboard recycling were calculated by assuming that \$657 per ton would have been paid to dispose of the material in the county landfill. Wastes that would have been treated as hazardous, such as oil, ash, and batteries, were assumed to cost \$1 per pound for disposal. Cost savings in reduction of HE-contaminated wastewater that would have to be treated to meet permit standards was estimated at \$0.30 per gallon.

ACRONYMS

AB	authorization basis
ESA	Engineering Sciences and Applications Division
BUS	Business Operations Division
CAB	Citizens Advisory Board
CQI	continuous quality improvement
DOE	Department of Energy
E	Environmental Science and Waste Technology Division
E2	energy efficiency
EPA	Environmental Protection Agency
ESH	Environment, Safety, and Health Division
ESH-ID	ESH Identification
ESH-PI	ESH Performance Indicator Group
ES&H	environmental, safety, and health
ESO	Environmental Stewardship Office
F&IB	Feedback & Improvement Board
FSP	facility safety plan
FWC	facility work control
FWO	Facility & Waste Operations Division
GSAF	Generator Set-aside Fee
HCP	hazard control plan
HR	Human Resources Division
IRMP	Integrated Resource Management Plan
ISM	Integrated Safety Management
JCNNM	Johnson Controls of Northern New Mexico
JIT	just-in-time
LANL	Los Alamos National Laboratory
LBNL	Lawrence Berkeley National Laboratory
LIR	Laboratory Implementation Requirement
LLNL	Lawrence Livermore National Laboratory
LPR	Laboratory Performance Requirement
LWC	lost workday cases
NEPA	National Environmental Policy Act
NMED	New Mexico Environment Department
NRC	Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
P2	pollution prevention
SBO	Small Business Office
SCP	Safety Concern Program
SWEIS	Sight-wide Environmental Impact Statement
TRI	total recordable incidents
UC	University of California